A PICTORIAL SURVEY OF CURRENT PRACTICE, EQUIPMENT AND MATERIALS

Construction Methods

OLOGY DEPT.

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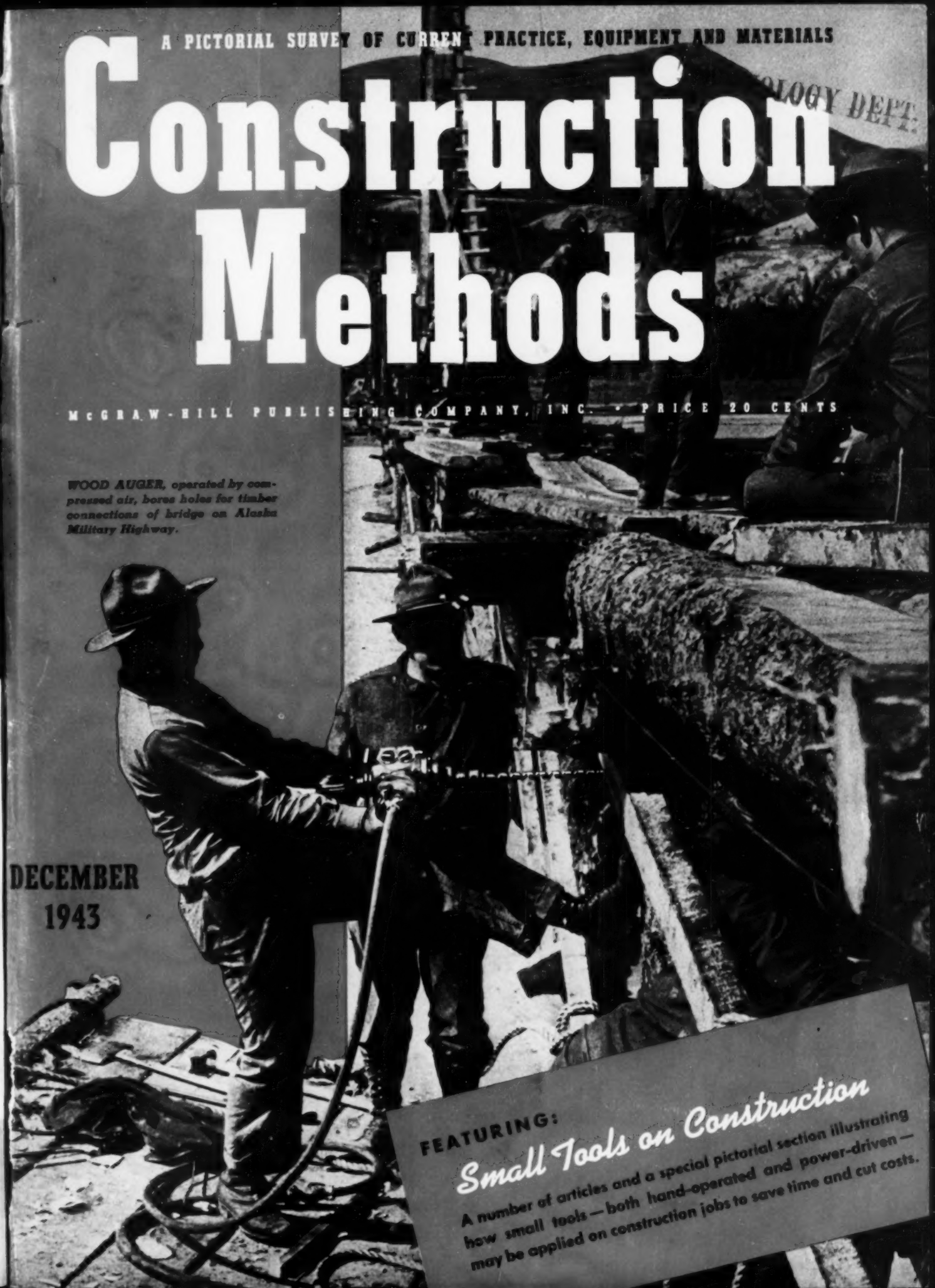

WOOD AUGER, operated by compressed air, bores holes for timber connections of bridge on Alaska Military Highway.

DECEMBER
1943

FEATURING:

Small Tools on Construction

A number of articles and a special pictorial section illustrating how small tools — both hand-operated and power-driven — may be applied on construction jobs to save time and cut costs.

This temporary bridge on the upper Liard River will be replaced by a steel span.

Bridges to Japan

"Bridges to Japan" are being fabricated from Inland plates and shapes, and shipped, along with Inland sheet piling, to sites on the 1670-mile Alaska Highway.

Pushed through in record-breaking time, this strategic highway is now being completed for the transportation of important military supplies to our Alaskan outpost.

The original bridges and piers on the highway were built largely of timber from surrounding forests. These temporary structures are being replaced now by bridges of steel. The new permanent bridges are built not only to withstand heavy military traffic during the war but to assure safety when the highway is opened to commercial and tourist traffic later.

These "Bridges to Japan" are but one of the many ways in which Inland steel is used in helping to win the war.

ARMY E NAVY

INLAND STEEL CO.

38 S. Dearborn St. — 50th ANNIVERSARY — Chicago 3, Illinois

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Construction Methods

A Pictorial Survey of Current Practice, Equipment and Materials

JOHN ABBINK, Publisher

ROBERT K. TOMLIN, Editor — A. E. PAXTON, Manager

Editorial Staff: Vincent B. Smith, Paul Wooton (Washington)
N. A. Bowers (San Francisco) Nelle Fitzgerald
Patricia McGerr

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The government has asked us to request your support in the present paper conservation and salvage campaign. Paper is needed in ever increasing quantities by our armed forces. The paper you save goes to them. Here's how you save it: (1) You make each piece, say, of writing paper do its full duty—you stretch every inch of wrapping paper; (2) You help your local stores save paper by discouraging double and extra wrapping of your purchases, and you ask your wife to carry her own market basket or bag to save paper bags; (3) You cheerfully accept the manufacturer's war packaging, as he simplifies his boxes and cartons to save paper; (4) You pass this copy of Construction Methods along, make it do extra work; (5) You save every bit of used paper for your local salvage drive.

DECEMBER, 1943

CURRENT JOBS
. . . and Who's Doing Them

BUILDINGS

Public—Manufacturing plant addition and rehabilitation in Indiana will be built by **Henry Ericsson Co.**, of Chicago, Ill., for an estimated $13,000,000. Navy contract for magazine storehouses, railroads and services in New Jersey went to **Cauldwell Wingate Co.**, of Asbury Park, for $9,157,917. **B-W Construction Co.** and **Sherry-Richards Co.**, of Chicago, Ill., submitted low bid of $7,597,000 for housing in Illinois. **Moore & Roberts**, of San Francisco, Calif., will build 1,896 family dwelling units in California for $2,884,589. Contract for housing in Utah was awarded to **W. E. Ryberg, Strong & Grant**, of Salt Lake City, for $2,000,000. Oregon housing contract for $2,250,000 went to **Wegman & Son**, of Portland. **Thoreson Construction Co.**, of Los Angeles, Calif., will build 240 double dwellings for an estimated $1,900,000. Maryland housing contract for $1,855,000 was awarded to **John A. Johnson & Sons, Inc.**, of Brooklyn, N. Y. Navy contract for $1,777,990 school went to **Woodcrest Construction Co. & Rosoff Bros.**, of New York, N. Y.

Industrial-Gasoline refinery in California will be built by **Lummus Co.**, of Los Angeles, for an estimated $13,000,000. **Austin Co.**, of Seattle, Wash., has $1,450,000 contract for locomotive shops in Montana.

Commercial-Dwelling costing over $2,000,000 will be built in California by **Griffith, Walker & Lee**, of Lakewood Village. Contract for apartment buildings in Ohio was awarded to **Loftus & Feldman**, of Cleveland, for $1,500,000.

HEAVY CONSTRUCTION

Pipeline carrier will be built in Texas for $7,000,000 by **Magnolia Pipe Line Co.**, of Houston. Contract for $5,500,000 harbor development in Pennsylvania went to **Dravo Corp.**, of Neville Island. Army contract for improvements in Alaska was awarded to **Morrison-Knudsen Co.**, of Boise, Idaho, for $3,000,000. **Geo. M. Brewster**, of Washington, D. C., has $2,370,000 Navy contract for New Jersey railroad. Navy contract for waterfront expansion in Virginia went to **Raymond Concrete Pile Co.**, of New York, N. Y., for $1,733,367. **H. B. Zachry Co.**, of San Antonio, Tex., has $1,345,000 Army contract for improvements in Texas. Aircraft plant improvements will be built by **Millsap, Berger & Sayre**, of Los Angeles, Calif., for $1,250,000.

HIGHWAYS AND BRIDGES

Among recent highway contract awards are the following: Alabama: $200,000 to **H. M. Donahoo**, of Birmingham. Massachusetts: $200,000 to **C. J. Maney Co., Inc.**, of Somerville. Michigan: $693,399 to **W. J. Meagher & Sons**, of Bay City; and $200,000 to **Lewis & Frisinger Co., E. B. Schwaderer & Co.**, and **Julius Porath & Son Co.**, of Ann Arbor. New York: $200,000 to **Peter Mitchell, Inc., & Paul Bacco & Son, Inc.**, of Greenwich, Conn.

To Construction Men,

Merry Christmas

Ever since Pearl Harbor the war has made a mockery of that spirit of On Earth Peace, Good Will Toward Men, that is symbolized by Christmas as we used to know it. There are long, grim, grief-laden days ahead, but through the smoke of battle we are now beginning to see the first faint, but unmistakable, outlines of victory and of better times to come—times in which construction men, who have applied their genius in such full measure to meeting war's needs, will revert to building those structures and providing those services that a world at peace will so urgently need.

On the eve of this holiday season construction men, always nomadic by reason of the special demands of their calling, are scattered, as never before, over the entire face of the globe. Some, within our own continental limits, are completing the largest construction program of all time to enable our armed forces to carry on. Others are overseas in theatres of war, variously located in arctic, temperate and tropic zones, building bases and airfields, constructing and maintaining lines of communication, bridging rivers under enemy fire, laying water and oil pipe lines, erecting structures to shelter troops or to house the assembly, servicing and repair of the vast amount of mechanical equipment that modern warfare demands.

And so, to you men of the construction industry, wherever you may be, *Construction Methods* sends its greetings. We wish you a very Merry Christmas and join with you in hopes for a victorious New Year.

The Staff of Construction Methods

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JAMES H. McGRAW, Founder and Honorary Chairman

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To .....

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Signed .....

Free Enterprise

The Opportunity and Obligation to Compete

WE can be prosperous beyond our dreams—all of us—workers, farmers, and business men—but one of the prerequisites is the self-discipline of accepting competition for ourselves as well as others.

* * *

Free enterprise does not imply the freedom to use any or all means to make a profit. It does not mean the right to monopolize. *It means the opportunity and obligation to compete.*

Competition requires *independence of action, free access to the market,* and *no large degree of control over the price* by any buyer or seller. In general, the larger the number of sellers and the more easily buyers can shift from one seller to another, the higher will be the degree of competition (and vice versa for buyers).

But let us not get too academic or go off the deep end. We cannot have perfect competition. We cannot subdivide businesses and labor unions into tiny units to make a multitude of buyers and sellers in each market; we cannot reduce our rich variety of products to a few rigidly standardized items; we cannot educate people to judge quality precisely; we cannot eliminate the costs of bridging space between buyers and sellers. On the other hand, have we gone as far as is practical and desirable in these directions?

We cannot even have a system of highly "sensitive" prices, that is, prices which fluctuate immediately in response to every minor change in demand and supply. This would occur in the dream world of competition-to-the-nth-degree. It cannot occur in the real world, or even in the ideal world of competition best suited to physical facts and human qualities. The economies of large-scale enterprise, the need for adapting products to human wants, the costs of transportation and the costs of issuing and acquiring market information put severe limits on price sensitivity.

Economists tell us that if prices were extremely sensitive, business booms and depressions would be much less severe—provided our stock of money remained fairly constant. But with the somewhat limited degree of sensitivity which is practicable in the economy, price and wage changes cannot prevent severe declines in business activity. *We cannot count on competition alone to cure depressions.* We must look mainly to other kinds of measures to prevent mass unemployment of men and machines.

If we cannot have prices which fluctuate with every small change in demand and supply conditions, we can work toward—and achieve, if we really want it—a system in which prices and wages are at least roughly responsive to long-run changes in demand and supply, a system in which most markets are not dominated by individual businesses, groups of businesses, labor unions, or farm organizations, and in which prices and wages are maintained at levels consistent with free access to markets and to jobs.

In any kind of an economic system there must be some means of determining prices, wages, and profits, and of bringing labor and capital into employment in the industry and place where they are most needed. There are two ways to do this: by administrative fiat or by the impersonal processes of the market. The first of these is typical of the totalitarian state; it frequently involves destruction of individual freedom or fumbling mismanagement. During the war all of us have had some experience with patronizing and paternalistic treatment by the state; we have found out what it means to be pushed around by bureaucrats; and we have discovered that the political determination of prices, wages, and profits leads to chaos when self-interest supersedes the fine fever of patriotism—as it eventually does. I do not mean to imply that we can do without controls over prices, production, and distribution in time of war; but I do suggest that we can learn something from their operation. Even with a united national purpose these controls work badly when human abilities are inadequate for the superhuman task, when personal or departmental jealousies crop up among officials, and when pressure groups try to prey on the rest of the public. Every day more Americans are beginning to understand why our forefathers feared the caprice and tyranny of power.

The impersonal processes of the market in determining prices and wages and in allocating productive resources will, in normal times, save us from the fumbling of bureaucrats and from the Babel of confusion, uncertainty, and annoyance produced by their regulations. But these market processes will not save us from paying toll to those who monopolize and restrict entry to markets or jobs.

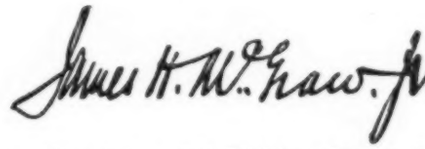
If we want an economy in which we are free to try out new ideas, develop new products, and introduce more efficient methods of production, if we want an economy in which there are great opportunities for men of imagination, inventiveness and energy, if we want an economy wide open to progress, then we must have a free field and fair competition for all comers—without collusion as to prices, markets, or production. This is the only basis on which we have a right to demand freedom from governmental regulation for ourselves and on which we can combat monopolistic tendencies in other quarters.

Let us stand squarely for the principles of the anti-trust laws and against all collusion and combination in restraint of trade. Let us insist that the government review with a critical eye every combination and consolidation which might restrict competition. Let us face frankly the problems of economic power arising out of price leadership and encourage every honest effort to find means to deal with them. Let us not shrink from questions as to whether some great aggregations of plants are too large for efficiency, free entry into the industry, and a free price. While we resist the efforts of the Department of Justice to extend the anti-trust laws by far-fetched and distorted interpretation, and while we fight every attempt to use them as a tool of persecution, let us cooperate in sincere efforts to modernize these laws and extend them by specific legislation to monopolistic practices they cannot now reach. I do not have a simple formula for this, but I believe we must try to find one.

We can then, better face the problem of the growing monopoly in labor which is threatening to make the free enterprise system unworkable. Today labor is going through a stage of empire building reminiscent in some ways of a similar stage in business three-quarters of a century ago. Witness the same buccaneering spirit, the same concentration on selfish interests, and the same disregard for the public welfare. Business leaders learned the hard way that the public will eventually rise up against those who prey upon them. Will our labor leaders be wiser? The right to collective bargaining to protect the weak position of the individual employee is one thing—but the grant of unlimited monopoly privilege to combine into a private government which can dictate its own terms to businesses, industries, communities, and even to the government itself, and which can start a wage-price spiral such as to hinder the war effort and make full prosperity impossible in time of peace is something quite different. We need to find a middle way which will prevent employers from exploiting employees but which does not sow the dragon's teeth. The exercise of arbitrary power by labor threatens not only business, but also all workers outside the unions and all those dependent on pensions and savings for their existence, and ultimately, of course, the well being of union workers themselves.

The idea that the labor problem can be solved if great, powerful organizations of employers will sit down with great, powerful organizations of labor is a delusion. If our experience in the N.R.A. and in the war teaches us anything, it is that the best that can be expected in the long run from such a situation is an armed truce with intermittent civil war. And every truce would be a monopolistic arrangement to take advantage of those not members of the great organized groups. Business and labor unions, whenever confronted with postwar readjustments that are unfavorable to them, will be sorely tempted to protect their own special interests at the expense of the public. There will be efforts on the part of businesses, abetted by labor unions, to limit productive capacity, to raise tariffs, to obtain subsidies, and to maintain prices at artificially high levels. The unions will oppose labor saving changes and will seek higher wages even in areas and industries of surplus labor. Already demands are emerging for direct joint action by business, labor, and agriculture to solve the transition problems of special concern to them. While these groups should have every opportunity to register their own self-interest, we cannot entrust our fate to decisions made by pressure groups. If experience is any guide, such coalitions will be almost certain to restrict opportunities for progress and expansion, to exploit the public, and ultimately to injure even the businesses, workers, and farmers included in them. We cannot afford a postwar N.R.A. Resort to temporary government regulation in the transition from war to peace may, however, be necessary in cases of great hardship.

We can be prosperous beyond our dreams—all of us—workers, farmers, and business men—but one of the prerequisites is the self-discipline of accepting competition for ourselves as well as others.



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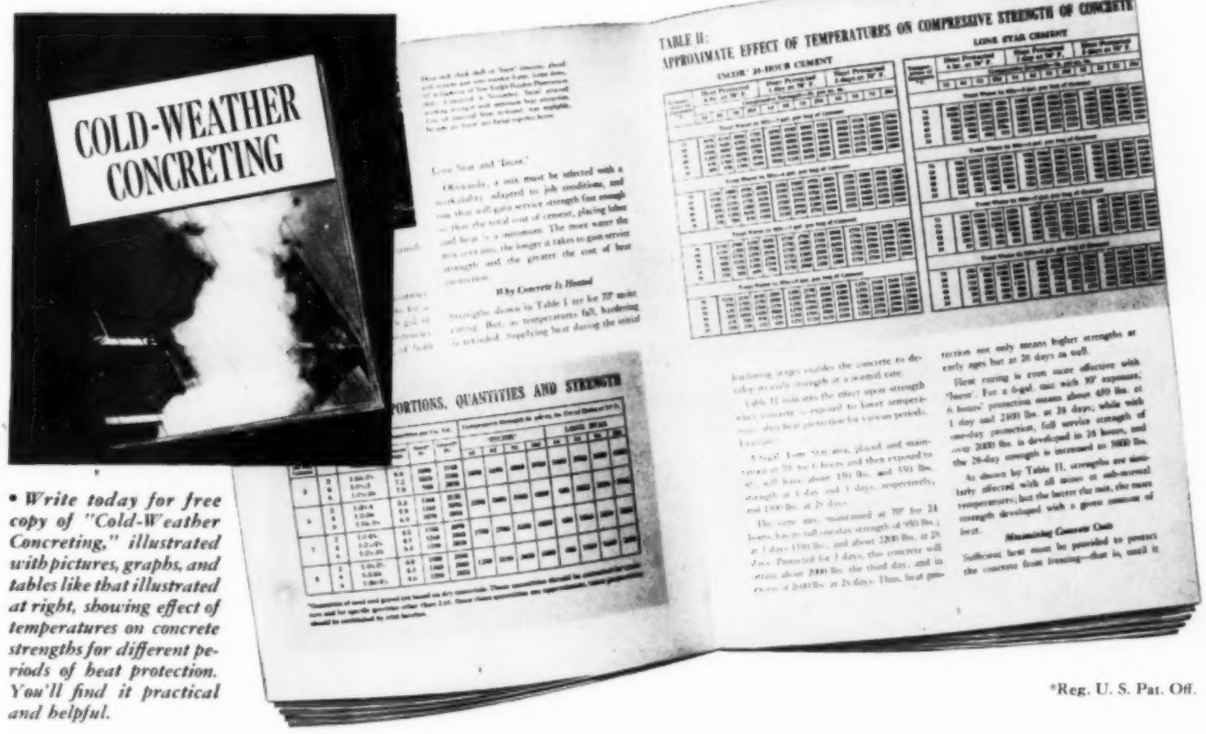
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*Reg. U. S. Pat. Off.

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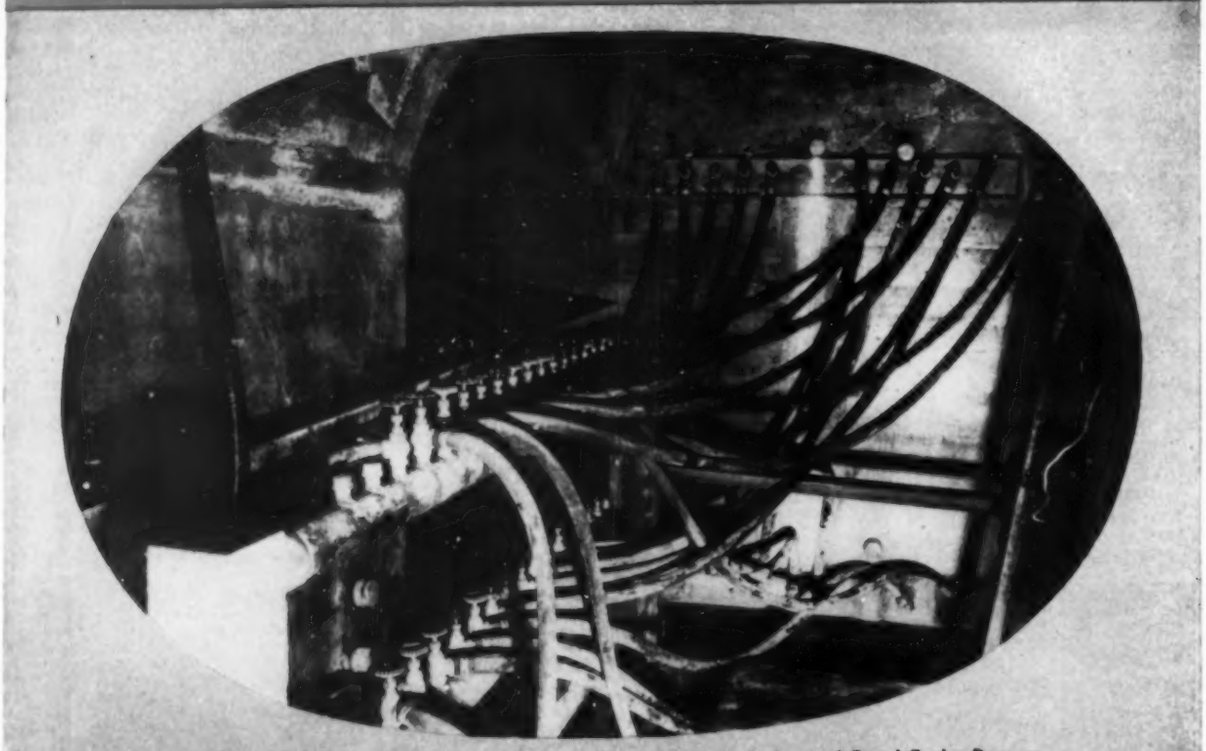

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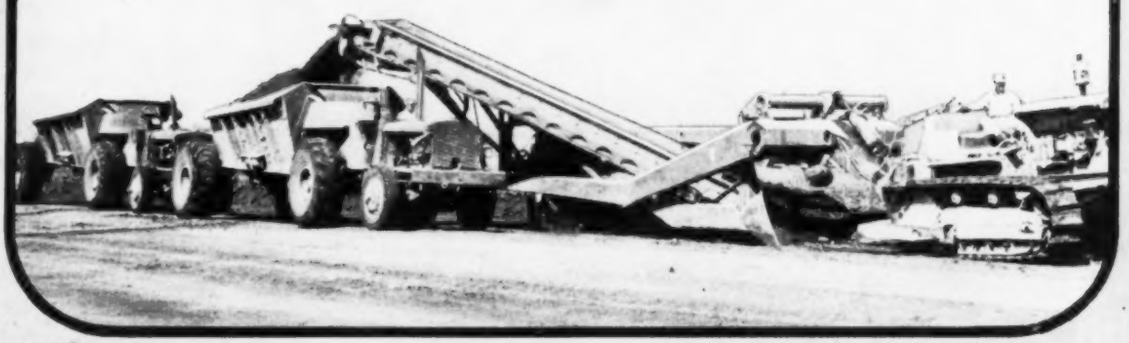

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For EARTH.. ROCK.. COAL.. ORE
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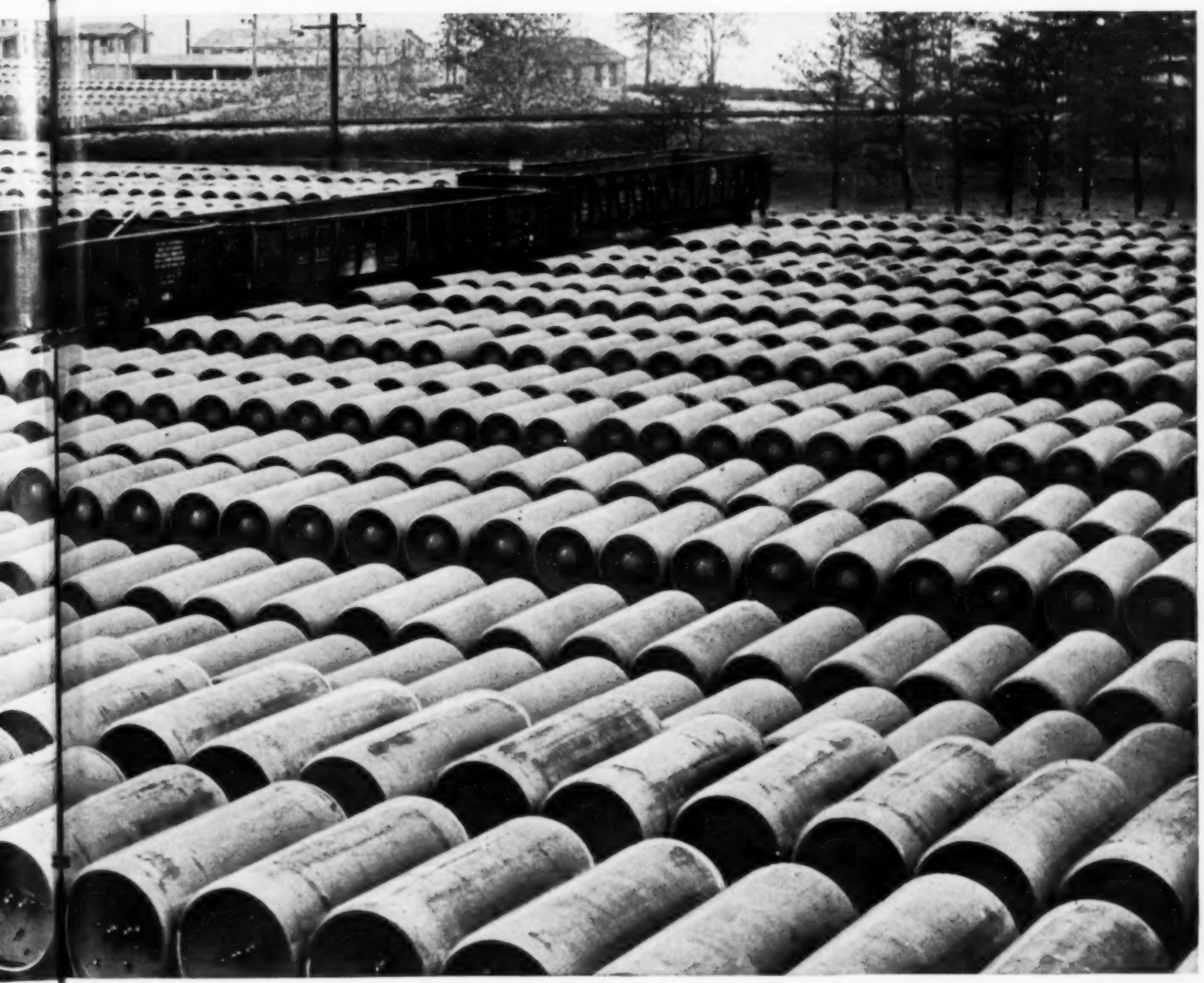

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★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

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Another FOOTESTEP FORWARD

THE employees and the management of the Foote Company, Inc. have received a signal honor — the Army-Navy "E" flies at the staff of the plant at Nunda.

The winning of "E" awards by the leaders of American Industry is not merely the result of an ability developed under the pressure of war. The achievement that merits such a recognition as an "E" award is the result of the years behind American Industry, the experience, the ability to organize, the desire to produce and get things done, the incentives of the good things of life that only effort, brains and the freedom that is American could make possible.

Under the system of free enterprise and free competition, the men of the Foote Company grew, met the needs of the expanding highway industry, became experience hardened in the crucible of successful years and depression, and, when the critical period of the war years arrived, the Foote organization was ready and capable of the expansion that is providing pavers far and wide for the advancement of American Arms.

The lessons of initiative and ingenuity taught and learned during American Industries' development are today the potent weapons of wrath that are proving to our enemies the invincible strength, decency and comfort in the American way!

MULTIFOOTE AND ADNUN ROAD PAVERS

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FOUR FAST MACHINES

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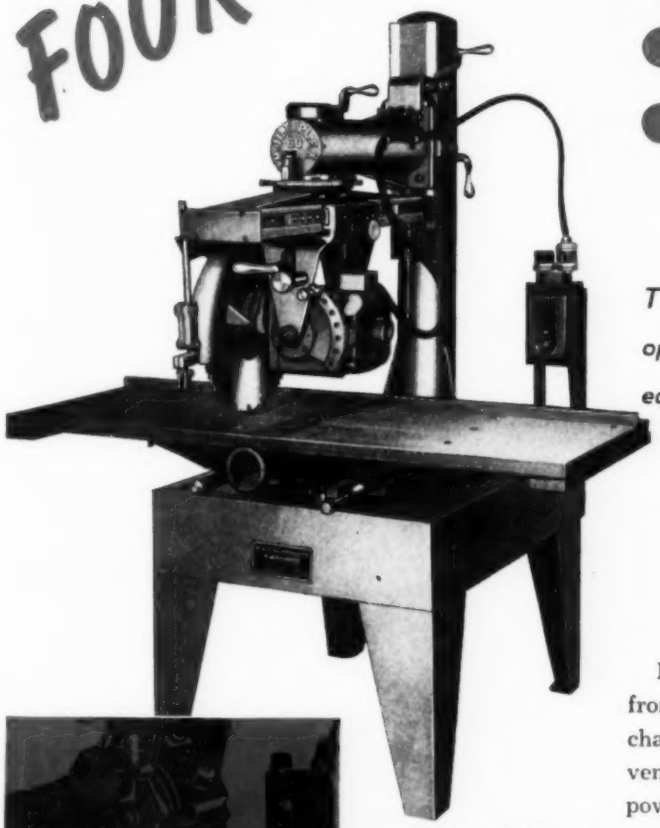
- USING A SINGLE OPERATOR
- IN 30 SQ. FT. FLOOR SPACE



The MULTIPLEX Wood Worker changes operations quickly -- is fast to handle -- equally good on variety work or production.

ANY SIMPLE OR COMPOUND CUT-OFF ANGLE

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In a matter of seconds, the Multiplex is changed from one wood working operation to another; changes that cover the range of four different conventional machines. Rigidity, smooth action, ample power, plus the fact that the work is stationary in most operations, account for unusual accuracy of cut and give the Multiplex high production speed when needed. An ideal all-around shop tool, the Multiplex is also invaluable in pattern shops, shipping rooms, millwright departments and on construction projects. Your inquiry will be relayed promptly to a near-by representative who will show you this time and labor saving machine that will speed up any job you hand it.

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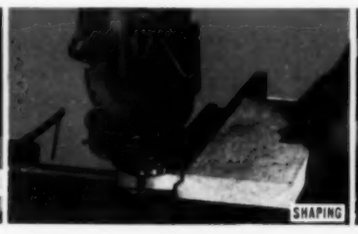
REPRESENTATIVES IN PRINCIPAL CITIES

ANY DADO CUT



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Now, when the pressure of the present emergency is putting more demands upon equipment than ever before, it is the hoist that was designed for better performance that's standing the strain.

When Victory is finally won; you will again want the advantages of Clyde hoists to help solve your construction problems. We'll be glad to give you information on your future Clyde hoist now . . . there's a wide range of sizes and types . . . a hoist for every job.

CLYDE

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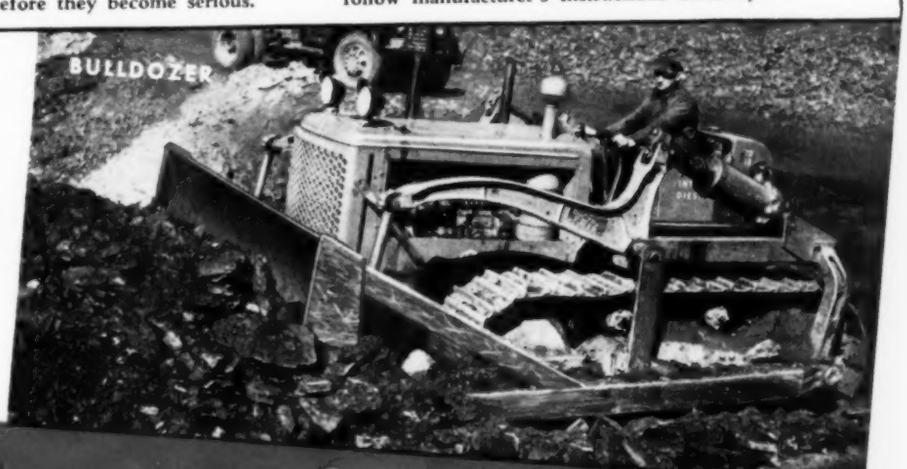
With new equipment reserved for our armed forces and existing equipment called on to take the punishment of wartime, highspeed 3-shift service, we've all got to pitch in and do a maintenance job as never before. Here are a few special hints that will prolong the useful life of your hydraulic Bullgraders and Bulldozers and keep 'em producing at top speed:

1. Watch the cutting edge and don't allow it to wear down to where the supporting casting is damaged.
2. Cutting edge can be reversed to give longer service when front edge is worn.
3. Keep the corner bits built up and hard-faced.
4. Don't allow pins to wear down too far before replacing or building up.
5. Inspect the blade and frame regularly for fatigue cracks, and weld them before they become serious.
6. Checking the hydraulic system should be regular routine. Be sure that oil is up to level and system is clear of air. A jerky, noisy machine is air-bound; a smooth one is free of air.
7. Drain the oil when it is dirty. Floating particles wear the pump and valve.
8. Keep all hose and pipe connections tight to prevent loss of oil and infiltration of air.
9. Inspect hydraulic hose to be sure it won't chafe and isn't twisted.
10. Keep bolts tight and all parts of the machine adjusted correctly.
11. Clean off dried mud or caked grease and maintain paint surfaces on all parts not subject to abrasion or moving contact.
12. Lubricate regularly. Use good grade lubricants and follow manufacturer's instructions carefully.

Your International TracTracTor Distributor will gladly advise you regarding proper maintenance and lubrication.



BUCYRUS ERIE TRACTOR EQUIPMENT

SEE YOUR INTERNATIONAL TRACTRACTOR DISTRIBUTOR

Shovels Are Weapons, Too

Good Blasting S-t-r-e-t-c-h-e-s Their Life

Increase production by getting more work out of your present equipment. Make buckets stretch—as far as possible, and last as long as possible.

Good blasting is one of the most effective "bucket-stretchers" you can find. And, an important part of good blasting is—use the right explosive for your job. Examine, for example, the qualifications of

ATLAS GELODYNS

Atlas Gelodyns combine some of the advantages of high count ammonia dynamites with some of the advantages of gelatin types. Gelodyns are sufficiently plastic to be retained in upward pitching bore holes. They are more moisture resistant than ammonia dynamites. They cost less per cartridge than gelatins of equivalent strength, and can frequently be substituted on a cartridge for cartridge basis. This affords attractive economies in highway and general construction blasting.

***Synergism**—*The meeting of minds "clicking together" from the impact of ideas to give a result greater than the sum total expressed—a "2 + 2 = 5" result. Synergism can be a big help toward making your equipment last longer.*

GRADE	% Weight Strength	Velocity, feet per second, in the open 1¼" x 8"	Velocity, feet per second, confined in pipe, 1½" x 8"	MINIMUM NUMBER OF 8" CARTRIDGES PER 50 LBS. (MAXIMUM 5% MORE)						
				1⅛"	1¼"	1½"	1¾"	2"	4"	5"
Gelodyn No. 1	65	10000	14000	129	107	73	55	42	11	7
Gelodyn No. 3	65	11000	15000	146	120	82	61	47	13	8

Working synergistically with explosives users, Atlas representatives have been able to help on many jobs. Perhaps they can make your equipment go further, too.*

Gelodyn: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES

"Everything for Blasting"

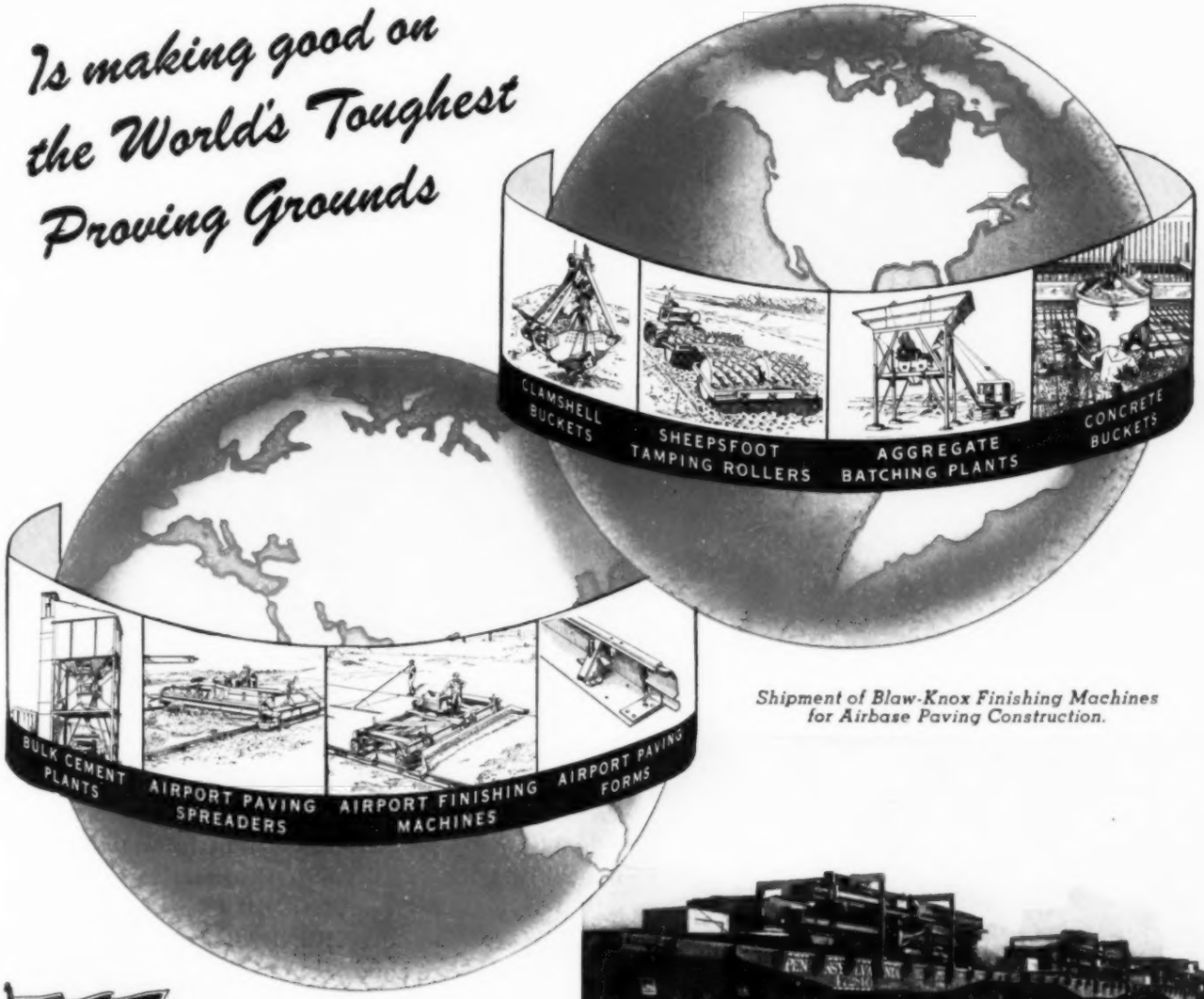
CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. · Offices in principal cities · Cable Address—Atpowco

Around the World!

BLAW-KNOX Construction Equipment

Is making good on the World's Toughest Proving Grounds



Shipment of Blaw-Knox Finishing Machines for Airbase Paving Construction.

ARMY-NAVY

BACK THE ATTACK
WITH WAR BONDS AND STAMPS

Get to know your Blaw-Knox distributor—he can help you with your equipment needs and maintenance.

Another trainload of Blaw-Knox Construction Equipment starts its long journey—destined for construction battalions overseas. Blaw-Knox Equipment is making good in every theatre of our global war—helping to build for an earlier victory.

BLAW-KNOX DIVISION OF BLAW-KNOX COMPANY

2066 Farmers Bank Bldg., Pittsburgh, Pa.

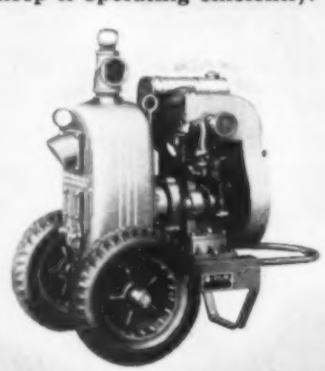
NEW YORK • CHICAGO • PHILADELPHIA • BIRMINGHAM • WASHINGTON

Representatives in Principal Cities

An "ARMY" OF SERVICE ENGINEERS at YOUR Command!

STERLING DISTRIBUTORS ARE READY TO SERVE YOU

Do not hesitate to call on your nearest Sterling Distributor. He maintains a complete staff of maintenance men, engineers, parts specialists, machinists and field specialists to keep your equipment in operation for the duration. You cannot replace your present equipment, but your Sterling Distributor will keep it operating efficiently.



YES an army of Sterling Service Engineers is at your instant command...every Sterling Distributor is ready to help you keep Sterling Pumps in constant war-time operation. When men like Charles H. Green, Manager Mechanical Equipment Department of Woodward, Wight and Company of New Orleans, say that Sterling Pumps deliver the goods and that they are easy to operate and efficient...that tells the story. The original quality built into Sterling Pumps is so apparent...they are RUGGED in construction, SIMPLE in design and DEPENDABLE in performance. It is this rare combination of virtues that has made the name Sterling outstanding in pumping circles everywhere. Write for complete literature on Sterling Pumps, Hoists and Light Plants today.

Allied Member A.E.D.
Member Contractors' Pump Bureau A.G.C.

STERLING QUALITY

Sterling
MACHINERY CORPORATION

405-13 SOUTHWEST BLVD. KANSAS CITY 10, MO.

4 ways to Save Time in '44

HERE'S WHAT *"THE SOCONY-VACUUM MAN"* OFFERS CONTRACTORS!

Now, going into '44, you're facing another year with irreplaceable equipment on rigid wartime schedules. To avoid breakdowns and delays, call your Socony-Vacuum representative for these four important time-savers:

1. Quality lubricants, the finest protection you can buy. Delvac Oils. Mobilube Gear Oils and Greases.

2. Expert help on maintenance schedules. Your local Socony-Vacuum man knows your problems. On your staff . . . but not on your payroll. . . he helps you find the causes of troubles.

3. Specialized lubricants for unusual applications. Socony-Vacuum makes the correct lubricant for every part of every machine manufactured.

4. Lubrication engineers on call. When necessary, your Socony-Vacuum representative will call in lubrication engineers to help you with special problems.

SOCONY-VACUUM OIL CO., INC., and Affiliates: Magnolia Petroleum Co., General Petroleum Corporation of Calif.

Mobilgas

SOCONY-VACUUM

SOCONY-VACUUM FUELS, LUBRICANTS AND ENGINEERING SERVICE

SPEEDS UP WORK

SAVES MATERIAL

The Construction Industry can well be proud of its war-time production record. Its high-operating efficiency — developed during peace — had much to do to bring the war to its "final phase."

In keeping with a well-established American principle, the contractors and builders of this country have long been quality-conscious about their production tools. This demand for greater efficiency through quality equipment is reflected in the wide-spread acceptance of "HERCULES" (Red-Strand) Wire Rope in the construction field.

Confidence in "HERCULES" (Red-Strand) Wire Rope is well founded, as it is a product of long experience — designed and manufactured to do specific jobs better . . . safer . . . more economically. It is available in both Round Strand and Flattened Strand constructions as well as in Preformed and Non-Preformed types. There is — in this one grade — a right rope for every heavy duty purpose.

The more hours of work you can get out of every pound of wire rope you use, the more steel you save for other vital war purposes. Regardless of the kind or make of wire rope you now have, it will not be able to give you the full service of which it is actually capable unless it is handled correctly and operated under proper working conditions. For further information on the proper use, care and application of wire rope, feel free to consult our Engineering Department.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

Another Northwest in ROCK

LOOK at this stuff. Here is rock that breaks the heart of ordinary operators and ordinary shovel equipment.

New Enterprise Stone & Lime Co., New Enterprise, Pa., tried Northwests out in this kind of digging back in 1939. They have since then placed two repeat orders, so you can draw your own conclusions as to how successful their first Northwest was.

If you have a real Rock Shovel you are prepared for the worst kind of digging a shovel has to do and you'll never have to worry about output in dirt. Repeat orders like these are the best evidence that after the "Duration" you will get the kind of shovel service you want from Northwest—service that will mean successful post-war contracts. Buy Bonds and watch the Northwests at work!

NORTHWEST

NORTHWEST ENGINEERING COMPANY
1728 Steger Bldg., 28 E. Jackson Blvd., Chicago 4, Ill.

.... If it's a real Rock Shovel you won't have to worry about output in dirt!

GULF LUBRICANTS AND FUELS *help speed work on another important flight strip*

"Gulf Quality Petroleum Products have proven effective insurance against unnecessary delays due to mechanical failures and breakdowns,"

. . . says Superintendent Bill Burton

GRADING upwards to 15,000 yards of earth each day, the Mecklenburgh Construction Company of Durham, N. C. is rushing the flight strip, shown above, to completion ahead of schedule. Their equipment has made an exceptional performance record on this job with Gulf lubricants and fuels in service.

Like many other contractors doing rush war work throughout the country, this organization has found Gulf products provide maximum protection when equipment is pushed to the limit. Gulf fuels and lubricants are scientifically manufactured to meet the most exacting requirements.

Call in a Gulf Service Engineer today and ask him to check over your equipment. He will recommend lubricants and fuels best suited to your particular equipment and operating conditions.

The Gulf line of more than 400 quality products—are available to you through 1200 warehouses located in 30 states from Maine to New Mexico. Write or 'phone your nearest Gulf office today.

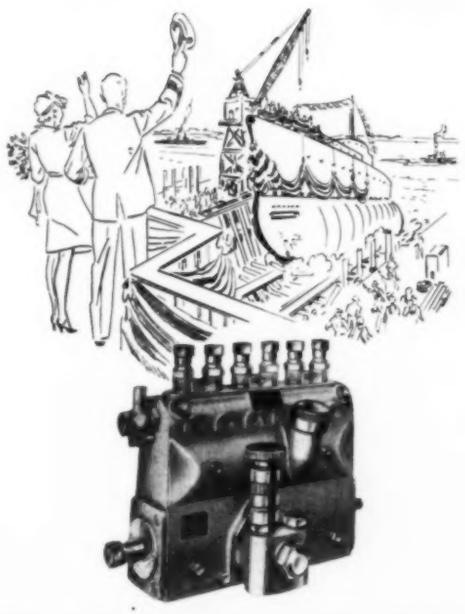
GULF

GULF OIL CORPORATION
GULF REFINING COMPANY
GULF BUILDING, PITTSBURGH, PA.

SPEED THE DAY OF VICTORY ★ BUY MORE WAR BONDS AND STAMPS

Testing fuel injection pump at American Bosch. Fit of plunger and barrel is so close that the only practical test is to measure the time the assembly will hold fuel oil at several thousand pounds pressure.

Sweetest Moment in a Sub-Man's Life



CRAMPED, stuffy hours yield to one delicious moment of relief as the hatch swings open and fresh air — sweet and cool as spring water — floods the tired sub. The crew relaxes . the ship slips at top speed toward the next objective . . . the Diesels have taken over.

During the dangerous daylight hours, a sub gets by on the stored-up energy of her batteries. But at night when power must be *created*, self-sufficient, dependable Diesels do the job.

Scores of subs, hundreds of Diesel-powered surface fighters and transport craft will slip down the ways this year.

To meet the tremendous demand for the necessary fuel injection equipment, American Bosch has greatly expanded production. Key to continued high quality is our staff of specialist craftsmen — many relative newcomers who have learned few jobs but each extremely well.

After Victory is won, Diesel engines will supply power for the vast job of rebuilding the world. American Bosch research, design, and production will then, as now, serve every branch of the internal combustion engine industry.

AMERICAN BOSCH CORPORATION • SPRINGFIELD, MASSACHUSETTS

AMERICAN BOSCH

AVIATION AND AUTOMOTIVE ELECTRICAL PRODUCTS . . . FUEL INJECTION EQUIPMENT

MODERN CRAFTSMEN IN THE NEW ENGLAND TRADITION

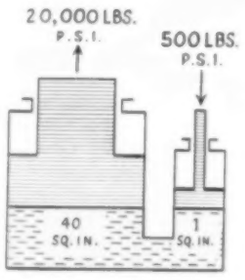
TRAINING LESSON No. 5
For New 'Dozer Operators

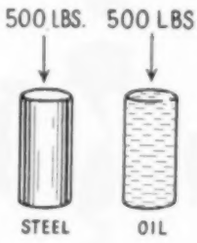
What is this thing called "Hydraulics"?

IN 1926, LaPlant-Choate engineers introduced the first bulldozer using hydraulic power to raise and lower the blade. Since that time — the hydraulic method has gained favor over mechanical means in many types of equipment —wherever smooth, efficient application of power is essential. Today you wouldn't buy an automobile without hydraulic brakes. Similarly, the modern trend is to fluid drives . . . hydraulically controlled machine tools . . . hydraulic steering and lifting mechanisms . . . and literally thousands of other recent applications, including vital landing gear mechanisms for bombing planes.

The Hydraulic Principle

THE BASIC principle of hydraulic transmission of power was evolved in 1658 A.D. by a French scientist named Pascal. Pascal discovered that a closed system of fluids *acts like a lever* in transmitting power — and that by applying a relatively small force to a *small* plunger at one end of the system, tremendously increased force will be exerted on a *larger* plunger at the other end. Explained in terms of a modern dozer, Pascal's theorem means simply this: If you have a pump (small plunger) forcing liquid into the hydraulic system under pressure of 500 *lbs.* per square inch — plus a pair of two-way jacks (larger plunger) with a combined area of 40 square inches — the total thrust at the end of the jacks will be 20,000 *lbs. per square inch.* Moreover, all the operator needs to do is to move a simple control valve and *Presto!* . . . all this surging power is directed instantly and smoothly into the dozer blade — forcing it down, holding it rigid, or raising it, as the job demands.





Oil As A Medium

IN practically all modern hydraulic equipment— including LaPlant-Choate dozers and scrapers — oil is used as the medium of power for a number of reasons. Besides providing excellent lubricating and sealing qualities, oil doesn't rust vital parts, doesn't freeze or evaporate. In addition, oil actually is as incompressible as steel. Did you know, for example, that a column of oil enclosed in a tight cylinder will withstand as much pressure as a solid steel cylinder of equal diameter? That's why oil under pressure has such tremendous strength and leverage — positive power which can be applied instantly in any direction.

Selecting The Right Oil

LIKE any piece of fine precision machinery, a hydraulic system requires *good, clean oil* of the proper type and grade to insure maximum efficiency and long life. In LaPlant-Choate hydraulic dozers and scrapers, tests indicate that best results are obtained with a straight, refined mineral oil, free of compounds and having good stability against oxidation. Correct viscosity, demulsibility and low pour point also are important. The oil tank should always be kept filled to proper level, and should be drained, flushed and refilled with new oil every 550 hours. Always use clean containers and funnels to keep dirt and grit out of the system.

SEE YOUR *LaPlant-Choate-"Caterpillar"* DISTRIBUTOR FOR GENUINE PARTS AND EXPERIENCED SERVICE

ARMY E NAVY

LAPLANT-CHOATE
MANUFACTURING CO. Inc.
CEDAR RAPIDS, IOWA
'DOZERS, SCRAPERS, RIPPERS, TAMPING ROLLERS
FOR LOW COST EARTHMOVING, LAND CLEARING, SNOW REMOVAL

Mister, you're mighty lucky to have those TWINS*

* "Caterpillar" *TWIN* Services

AND we are justifiably proud to be their Papa! They'll serve you well with a minimum of care and cost. We saw to that in the beginning.

TWIN Number One is called "Factory Built-in Service." His very important brother is "Dealer Quality Service." Together, they bring vigorous, dependable, year-round PERFORMANCE from your "Catérpillar" Diesel equipment.

For example, Number One represents "Caterpillar's" basic engineering skill and precision workmanship which have given you

(a) *Simplicity of operation.*
(b) *The ability to work in any climate, on any job.*
(c) *The ability to burn a wide variety of fuels.*
(d) *Proved — again and again — dependability.*

Number Two—"Dealer Quality Service"—offers you

(a) *Factory-trained service men.*
(b) *Modern shops.*
(c) *Special tools.*
(d) *Money and metal saving repair methods.*

This particular "TWIN" is vitally essential to you right now. Make it a point to see him regularly!

There is scarcely a "Caterpillar" Diesel Tractor, Motor Grader, Engine or Electric Set—regardless of age or usage—that hasn't a lot of dependable working hours left in it. "Dealer Quality Service" will help you keep it on the job.

REMEMBER

THE FIGHTING FOUR

INSPECT. Look your equipment over frequently. For expert "internal" inspection, call in a trained "Caterpillar" Service Man. Read your Operator's Instruction Book.

LUBRICATE. Use the right oil at the right time in the right place and in the right quantity. Keep it clean and replace before it deteriorates.

ADJUST. Tighten all bolts. Keep valves and clutch in proper adjustment. Read the Operator's Instruction Book.

REPLACE. Have "Dealer Quality Service" recondition or replace worn bearings, cylinder liners, clutch linings and other parts vital to restored power and extended engine life.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

WHY *the* STEEL COMPANIES *Again* NEED MORE SCRAP

. . . HERE ARE THE FACTS—

WILL YOU HELP?

Again a shortage of scrap threatens to curtail production of steel for war. Again the fullest cooperation of all industry is needed to avert the serious consequences. Will you help!

There are several contributing factors to the threatened scrap crisis:

Inclement weather may bring the ore shipping season to an early and abrupt end, necessitating the use of additional scrap in the open hearth furnaces.

A severe winter may handicap the normal collection and movement of scrap.

A shortage of coal may cripple the production of iron in blast furnaces, and require the use of a greater proportion of scrap in making steel.

A breakdown in transportation may likewise force the use of more scrap to hold steel production at the peak level.

Frankly, there is a great possibility that one or all of these factors may suddenly cut our output of steel —unless we get in the scrap now.

Steel mills must have 15,000,000 tons of scrap to carry them through the winter at capacity output.

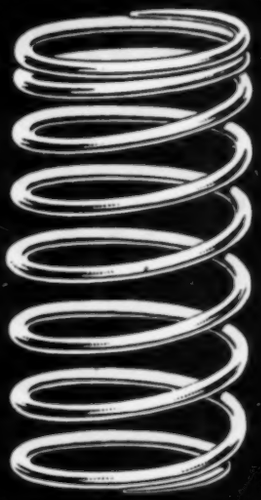
You can do your part. Revitalize your scrap committee and see that it immediately starts all scrap on its way to the steel mills. Clear out all your scrap *now*, and keep it coming —every ton counts.

At this critical point in the war *we must not falter.*

INLAND STEEL COMPANY

CHICAGO

You can buy a new Umbrella in 10 minutes . . .



. . . but it may take weeks to replace a ruined valve spring

The answer is Preventive Maintenance now with Shell Diesel Lubricants

SHELL

MANY DIESEL OPERATORS have learned to their sorrow that you just can't "step up to the counter" these days and get a valve, spring, piston, bearing or other vital engine part, just when you need it. Even when a manufacturer has parts in stock, overtaxed transportation facilities cause delays in delivery. In the meantime valuable equipment that should be speeding production is slowing production by being idle.

Don't let these "outages" of equipment plague you. Go over your maintenance set-up now. This means a more careful selection of lubricants . . . more frequent check-up periods.

These more frequent check-ups may take a little longer, but those few extra minutes spent now will pay you big dividends in the time and money they'll save you later.

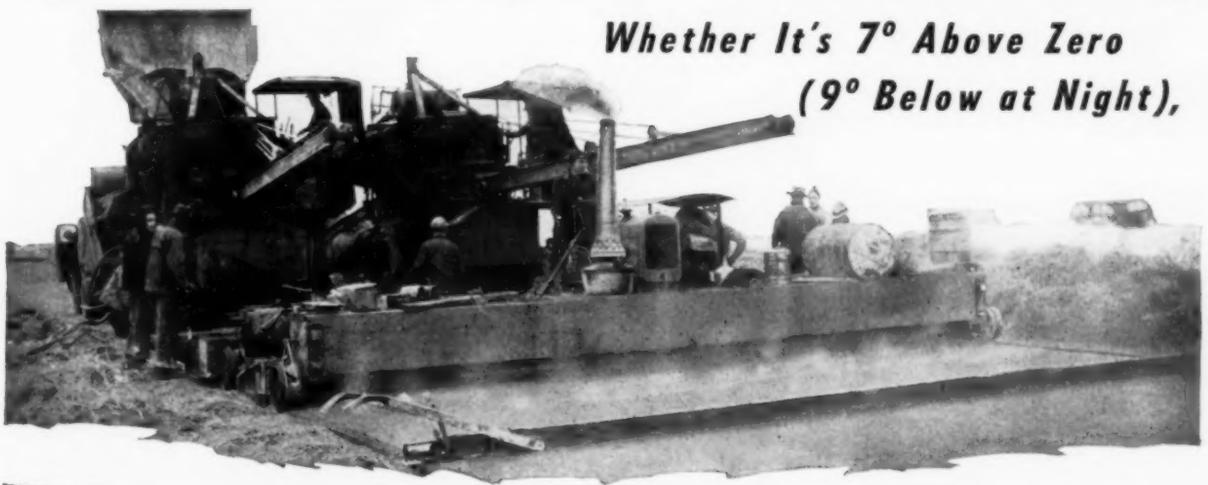
Don't wait for trouble to remind you that you should gear your maintenance procedure to wartime tempo. Call in the Shell man now. Let him help you plan your Preventive Maintenance.

ARMY E NAVY

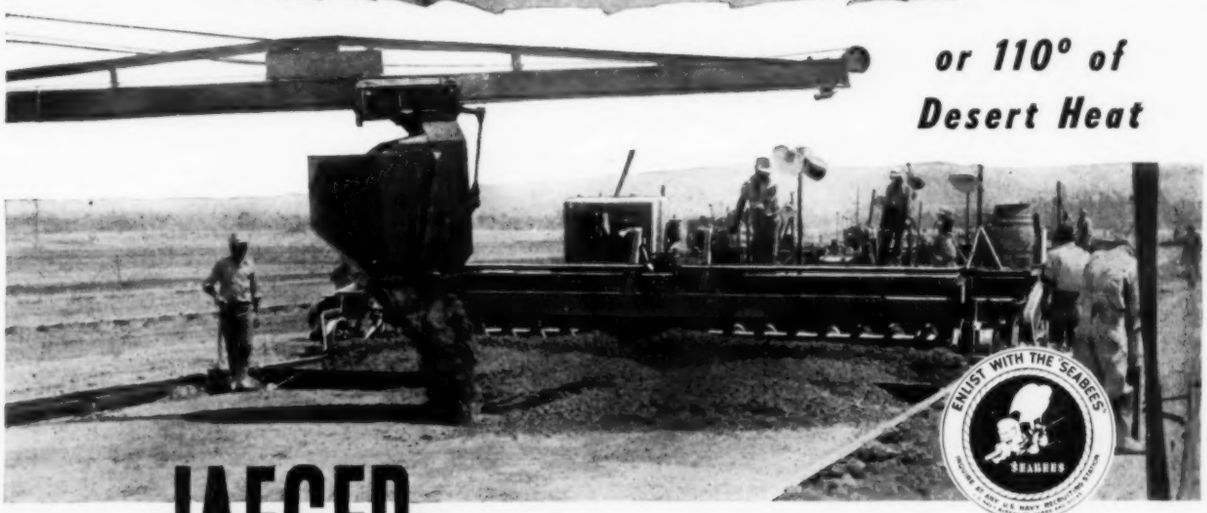
First oil refinery to win Army-Navy "E" — Shell's Wood River Refinery.

SHELL DIESEL LUBRICANTS
AND SHELL "DIESELINE"

Mechanized Paving { Originated by JAEGER-LAKEWOOD } Speeds YEAR'ROUND Airport Building

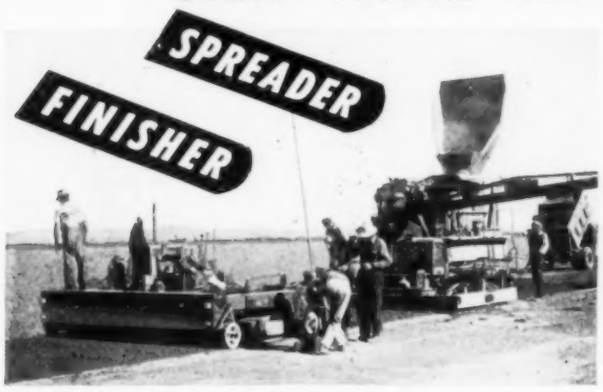


Whether It's 7° Above Zero (9° Below at Night),



or 110° of Desert Heat

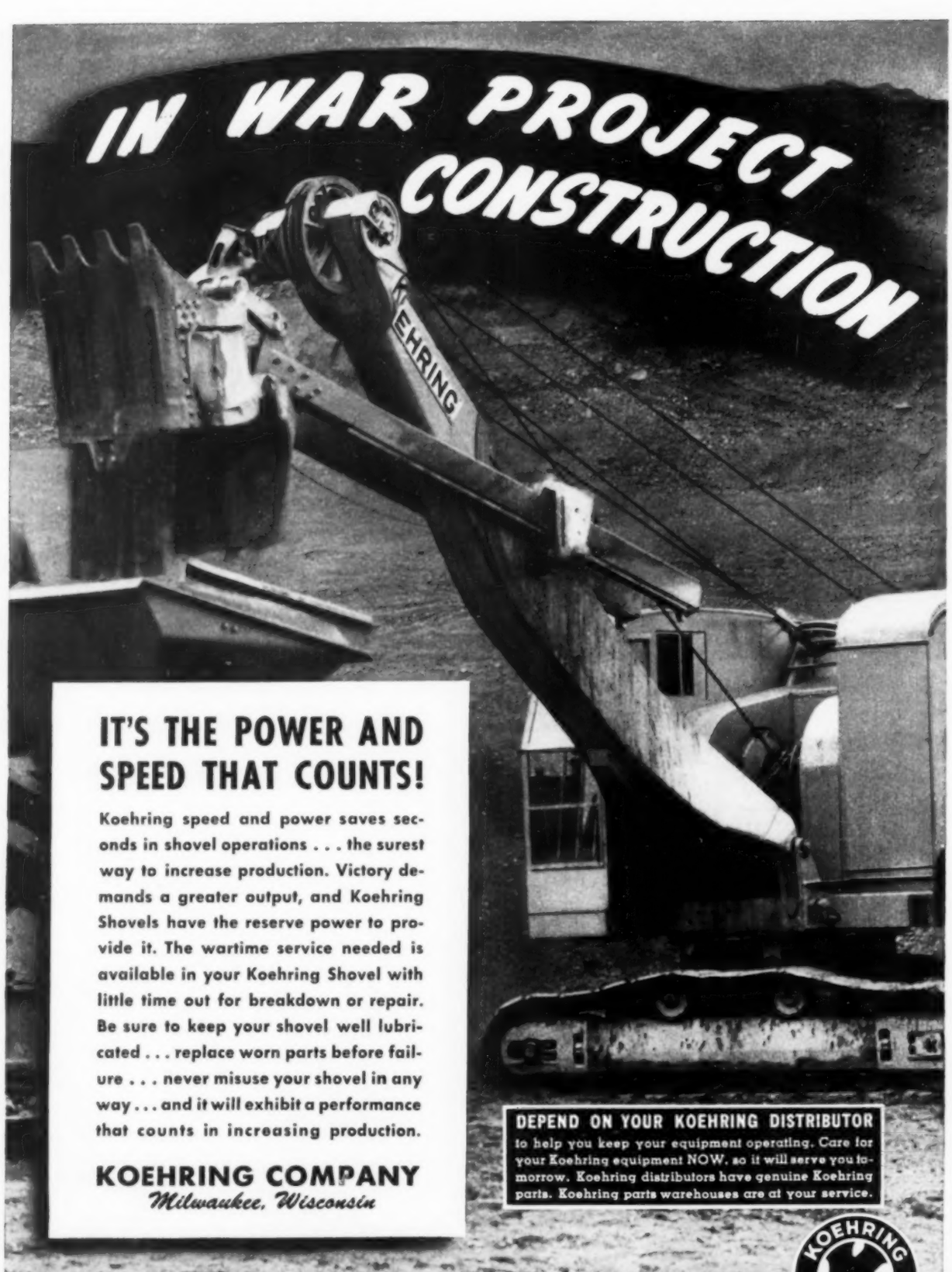
THIS JAEGER TEAM CAN TAKE IT!



The Finishing Machine (originated by Jaeger-Lakewood in 1917) and the Concrete Spreader (originated by Jaeger in 1931), teamed with the modern paver, have made possible today's year 'round paving of vitally-needed airports, made possible today's high production*, made practicable the handling of today's dry mixes without segregation and with a minimum of manpower. By finishing millions of sq. yds. of slab in sub-freezing temperatures and, on some jobs, maintaining constant 24-hours-a-day operation over many months, these machines have further demonstrated why contractors depend on Jaeger-engineered equipment to meet their severest schedules and deliver a satisfactory and profitable finished job.

*Over 275 linear ft. per hour in 25 ft. width, over 475 linear ft. in 10 ft. width of denser, stronger, smoother slab.

THE JAEGER MACHINE CO.
800 Dublin Ave. Columbus, Ohio
Mixers, Pumps, Hoists, Paving Equipment



IT'S THE POWER AND SPEED THAT COUNTS!

Koehring speed and power saves seconds in shovel operations . . . the surest way to increase production. Victory demands a greater output, and Koehring Shovels have the reserve power to provide it. The wartime service needed is available in your Koehring Shovel with little time out for breakdown or repair. Be sure to keep your shovel well lubricated . . . replace worn parts before failure . . . never misuse your shovel in any way . . . and it will exhibit a performance that counts in increasing production.

KOEHRING COMPANY
Milwaukee, Wisconsin

DEPEND ON YOUR KOEHRING DISTRIBUTOR to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

SMALL TOOLS *for* BIG JOBS

WHITEMAN Concrete Equipment Conserves manpower, saves time on concrete slab work.

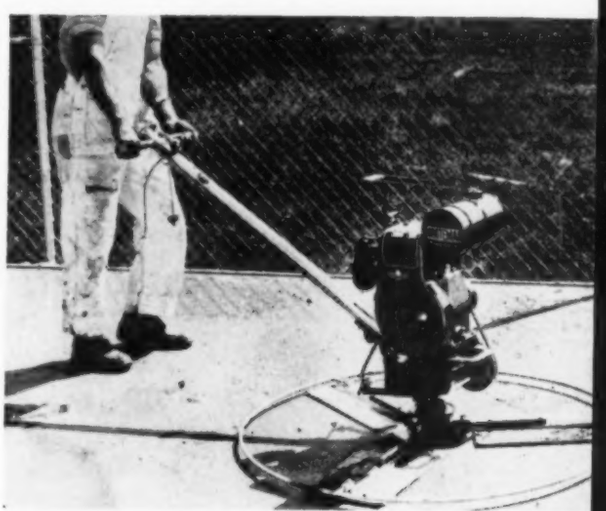
MULTIPLY the work capacity of even "green" hands with Whiteman Equipment — the machines do the work. Your concrete slab work will no longer be a problem — for screeding use the Whiteman Rodding Machine; for floating and finishing use the Whiteman dual-purpose Finishing Machine. Here's how they work:

SCREEDING — One-man operated, the Whiteman Rodding Machine with power-driven rod sticks (screeds) making 4 in. transverse strokes on the header boards, simultaneously levels and compacts the distributed pour — 4 cu. yd. of low slump mix can be handled in 5 minutes.

FLOATING — Attach the "Heavi-Duti" Float Trowels to the dual-purpose Whiteman Finishing Machine and one man guides the revolving trowels over the slab. A perfect float finish is obtained at high speed — 1,000 sq. ft. covered in as little as 15 minutes.

FINISHING — Using the same dual-purpose Whiteman Finishing Machine, attach the "Finish" Trowels. These light, flexible and adjustable-pitch blades bring up the surface in a hurry, producing a harder, denser surface free from voids or laitance.

SCREEDING — Experienced contractor users report 4 cu. yd. of low slump mix leveled and compacted in 5 minutes using the Whiteman Rodding Machine.



FLOATING & FINISHING — For floating use the "Heavi-Duti" Float Trowels; the light, flexible "Finish" Trowels do the finishing job.

WHITEMAN SCREED STAKE CAPS save time and labor. You can make up your own 2x2" wood stakes on the job, cutting them to lengths needed to fit ground conditions. Drive the stakes and then adjust the tough, malleable iron cap to the proper level. Screeds may be either 2½" pipe or 2x4s.

WHITEMAN ADJUSTABLE SCREED STAKE — a new all-metal ADJUSTABLE screed stake that minimizes time for screed header placement in any soil. The pin (available in 9" and 12" lengths) is set in the ground; then horizontal ground bar is placed firmly on the ground and locked with set screw; final grade is obtained by sliding head up or down. Entire stake is easily reclaimed.

WHITEMAN HAND TAMPER for use on small work. A denser floor is obtained with more even distribution of finer aggregates, leaving a "fat" sufficient for finish. With a good mix, dry topping is unnecessary. This inexpensive, lightweight, adjustable and collapsible Tamper will save much time on small work.

FOR FURTHER INFORMATION WRITE OR WIRE FOR THE NAME OF YOUR NEAREST DISTRIBUTOR.

Whiteman MANUFACTURING CO.

3249 Casitas Avenue — Los Angeles 26, California

Official U. S. Army Signal Corps Photograph

POWER TO ATTACK
relies on power to *construct*. For *safe* increase of *CONSTRUCTION* machinery service hours use . . .

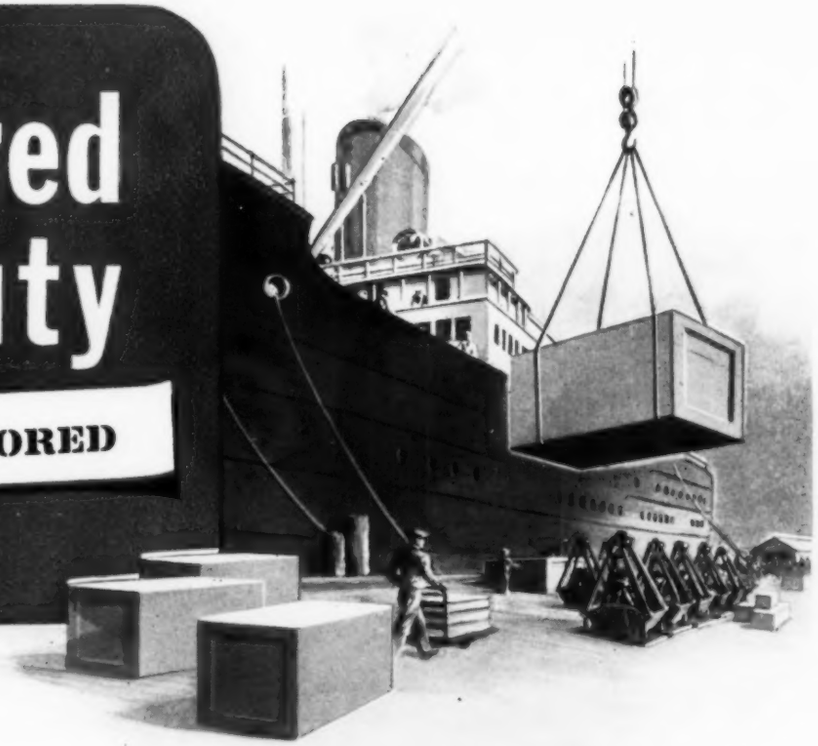
SINCLAIR SPECIALIZED LUBRICANTS.
Sinclair Pennsylvania and Opaline Motor Oils provide efficient engine lubrication under heaviest loads and continuous operation. Quality gear oils and greases save wear and reduce replacement costs.

(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

SINCLAIR LUBRICANTS-FUELS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY (INC.), 630 FIFTH AVENUE, NEW YORK 20, N. Y.

Ordered to Duty in CENSORED



Today's war is one of MEN, MACHINES and SPEED. Like lightning the Allies strike with a shock that reels back the enemy—certain evidence of the teamwork, planning and genius of our armies, engineers and construction battalions. Of the construction equipment speeding us on to victory all three types made by Haiss are at the front. We feel a sense of pride and satisfaction in that Loaders, Conveyors and Buckets, too, are fighting equipment needed to win the war.

We can't discuss where or how our buckets and loaders are used; but wherever they are, you will know that a Haiss unit will give the service required of it . . . We and you both *know* that, because *for more than 50 years* the Haiss name has stood for satisfactory service.

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"cheap logs" is *Conservation*

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CUMMINS
Dependable
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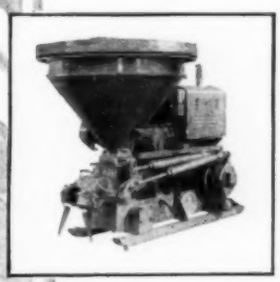
In 1936, with the introduction of the Cummins Diesel, the logging industry started on a new era of lower operating costs and added savings in manpower. "Shows" which would have been inaccessible or highly unprofitable became duck soup when Cummins Diesel-powered trucks demonstrated their ability to handle loads of 100 to 200 thousand pounds at an over-all operating cost far below previous transportation figures. The Cummins Diesel-powered yarder was easy to move and the engine's flexibility and torque characteristics, plus its proved economy and direct savings in manpower, soon made it the choice of shrewd loggers.

Today, after seven years' experience with all types of diesels, the Cummins Diesel is the first choice of the loggers in trucks, yarders, loaders and donkeys because it has made "Cheap Logs" a fact. Cummins Diesel power put the logger in a position to deliver more logs at a lower cost . . . this is *real* conservation. CUMMINS ENGINE COMPANY, Columbus, Indiana.

He DEFEATS GRAVITY in placing concrete



REX Mechanical Engineering—REX M. E.—

likes to start from scratch with new engineering principles and carry them through to development. He did that in developing Pumpcrete—the pump that makes it possible to place concrete by pipe line.

Rex M. E. has given Pumpcrete a long placing range. *The 160 Pumpcrete can pump concrete a horizontal distance of 800 feet, or a vertical height of 100 feet.*

Larger Pumpcretes are capable of forcing concrete *as high as 120 feet or as far as 1200 feet.*

So well did Rex M. E. do his job that today Pumpcrete has become a *standard* piece of concrete-placing equipment. It has successfully lowered costs on jobs *of a few hundred yards,* as well as jobs requiring *several hundred thousand yards.*

Practically all consistencies, having from ½" to a 10" slump, have been pumped by Pumpcrete with satisfactory results.

To answer the question "Is it a Pumpcrete job?" Rex Pumpcrete Specialists have published an interesting reference manual on the Rex Pumpcrete profusely illustrated with photographs and drawings of many types of Pumpcrete jobs. You can secure a copy—as well as the consulting services of one of these specialists—by writing Chain Belt Company, 1664 West Bruce Street, Milwaukee 4, Wisconsin.

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Concrete Mixers • Moto-Mixers
Pavers • Mortar and Plaster Mixers
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CHAIN BELT COMPANY *OF MILWAUKEE*

HAZARD LAY·SET *Preformed* REWARDS YOU BY—

One of these invariably justifies its specification

1 LASTING LONGER
2 BEING SAFER TO HANDLE
3 SPOOLING BETTER
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5 REQUIRING NO SEIZING
6 REFUSING TO "PORCUPINE"
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8 BEING FREE OF TENDENCIES TO KINK
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The absence of internal stresses in Hazard **LAY-SET** Preformed wire rope makes it unnecessary to seize the rope with serving wire before cutting. Every wire and every strand is "at ease," comfortable in its assigned position, not at straining odds with every other wire and strand as is the case with non-preformed rope. Here is proof positive that **LAY-SET** is easier, faster, and safer to handle; that being free of torsional strain it will work better, last longer, give greater dollar value. Specify Hazard **LAY-SET** Preformed for *all* its built-in advantages.

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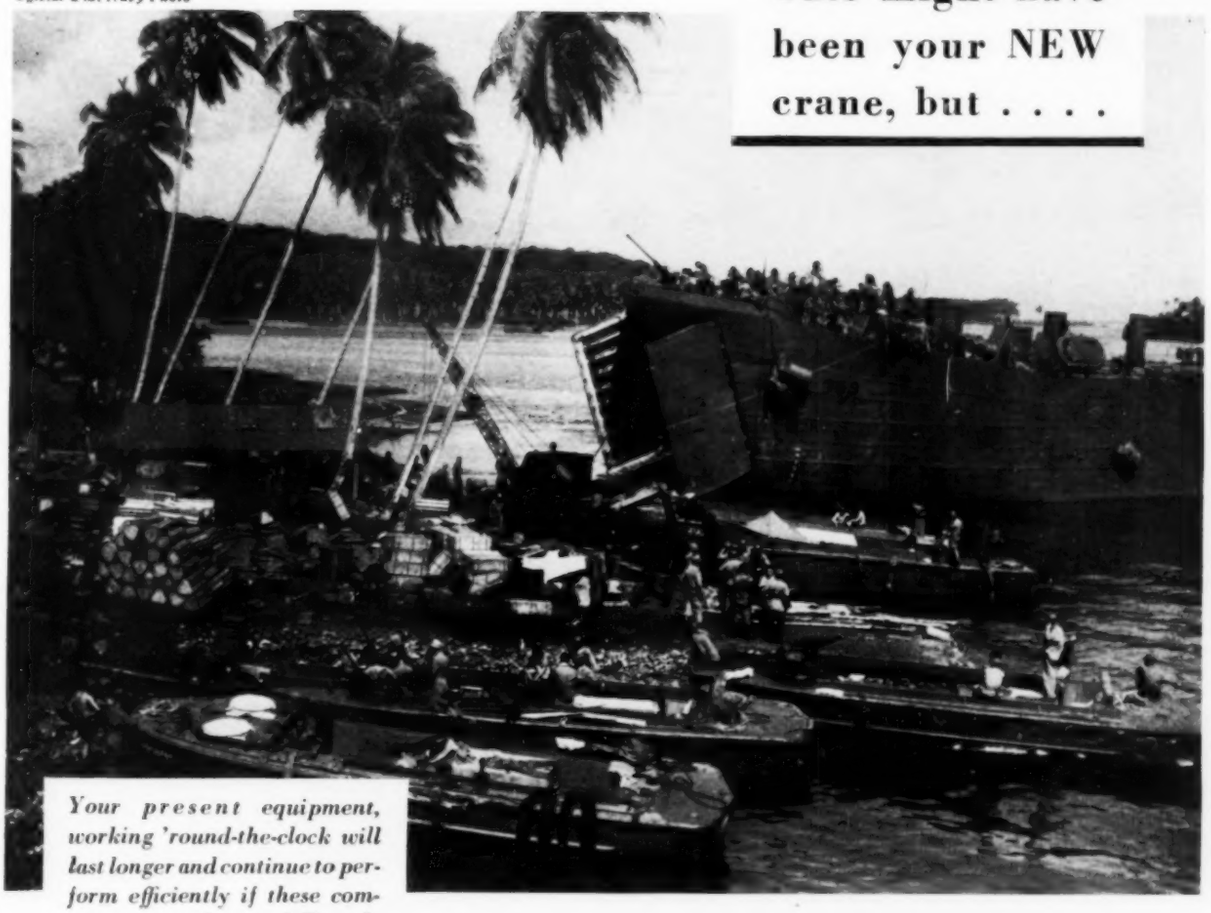
AMERICAN CHAIN & CABLE COMPANY, INC. • BRIDGEPORT • CONNECTICUT

GREEN FLAG SIGNIFIES MAN SAFETY

HAZARD LAY·SET *Preformed* WIRE ROPE

Official U.S. Navy Photo

This might have been your NEW crane, but . . . .



Your present equipment, working 'round-the-clock will last longer and continue to perform efficiently if these common-sense rules are followed:

- insure proper regular lubrication.
- provide daily inspection to detect troubles while they are still small
- make adjustments when needed—don't wait
- tighten loose bolts and nuts
- keep fuel, lubricants and water clean
- remove clutch and brake bands and clean lining with good grade of clear gasoline
- change cables end-for-end to increase life of wire rope
- plan work to favor machine
- inspect engine regularly — flush radiator when dirty
- always give model and serial numbers when ordering repairs
- contact your BAY CITY distributor for parts and service.

here again BAY CITY helps keep the supply lines moving at Rendova

Wherever the bow doors of an LST swing wide to emit a flow of supplies to support a new advance against the enemy, you will usually find modern excavating and material handling equipment speeding the job. Here at Rendova Island, a BAY CITY convertible crane helps prepare the way for the capture of nearby Munda. Your new equipment has gone to war — let your dollars follow by investing in War Bonds. Yes, every Bond you buy now can be car-marked for new equipment to take care of your post-war needs. BAY CITY shovels, cranes and draglines will be available with both crawler and pneumatic tire mounting. Why not write for catalogs so you will have them when needed? BAY CITY SHOVELS, Inc., Bay City, Mich.

BAY CITY SHOVELS
12 Sizes
⅜ to 1½ Yard
Also truck mounted shovels and cranes

BAY CITY

SHOVELS • CRANES • DRAGLINES • TRENCH-HOES • SKIMMERS

Built with Disston dependability, this improved type of Chain Saw is a pace-setter for production, whether you are cutting green timber or seasoned lumber—hardwoods or softwoods.

One of these Chain Saws—light in weight, easy to handle—can do the work of 20 men. Easy to operate—requires no previous experience.

Among the outstanding features of this saw are teeth of specially heat-treated Disston Steel and a patented Disston automatic chain tensioning device.

Pneumatic power model operates on 90 cubic feet of air per minute at 90 lbs. per square inch pressure at the saw.

A Disston Electric Chain Saw Sharpener is available for keeping chain in top-notch cutting condition.

DISSTON

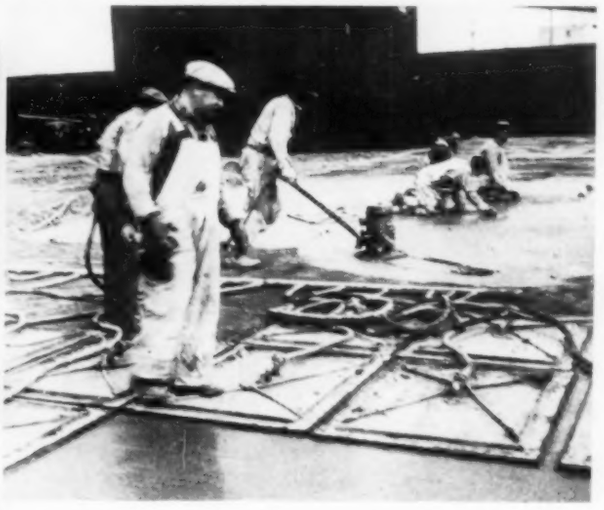
Gasoline Powered units in 2- to 7-foot capacities, powered by a 6 or 11 H.P. Mercury engine are available. Electric models soon will be announced. See the Disston distributor in your locality for further information—or write to Henry Disston & Sons, Inc., 1248 Tacony, Philadelphia 35, Pa., U.S.A.

CUT 2/3 OFF YOUR FLOOR SLAB OVERTIME THIS WINTER

with VACUUM CONCRETE!

Laborer is standing on VACUUM-dewatered concrete. Note the finisher is bull-floating freshly placed concrete directly in front of Vacuum suction mats.

Nothing to buy—Truck mounted Vacuum pump carrying complete processing equipment is furnished on rental basis. Services of Supervisor to train and direct your men in handling of equipment furnished at no extra cost.



Cement finishers power-floating and trowelling VACUUM-dewatered concrete *immediately behind* VACUUM suction mats. No waiting hours for water to disappear from slab; no dust coat application—just VACUUM-process and start finishing. You can concrete until five o'clock and send the finishing crew home at 7 P.M., instead of Midnight or 3 A.M.

Send coupon at right for money saving information ➡

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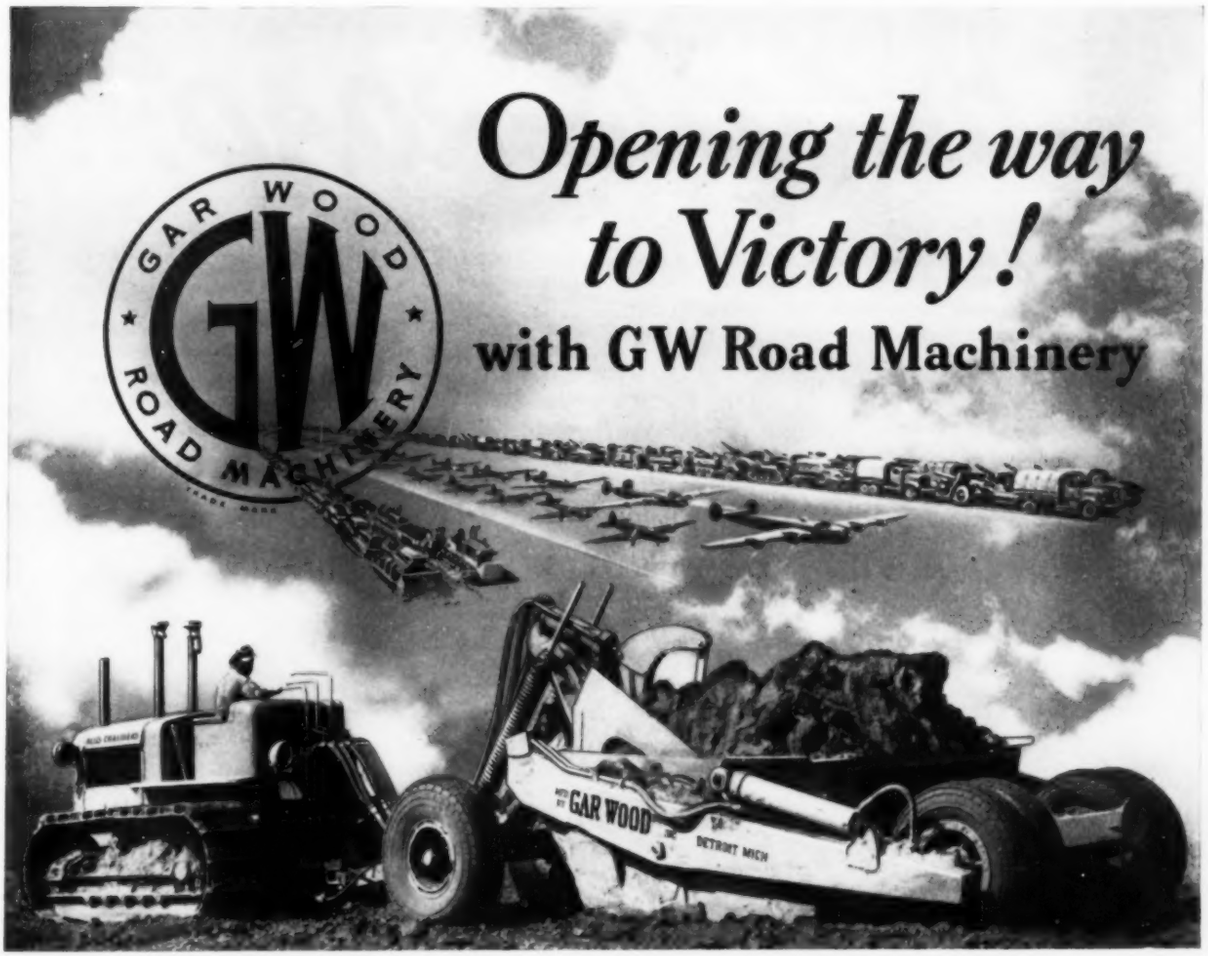
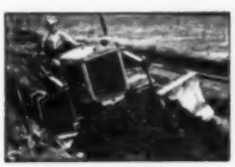
Opening the way to Victory!

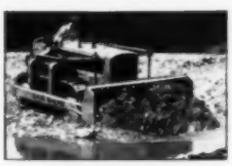
with GW Road Machinery

GAR WOOD ★ GW ★ ROAD MACHINERY

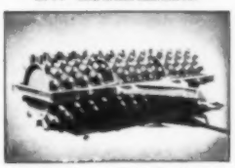




GW Roadbuilders



GW Bulldozers



GW Tamping Rollers

GW Rippers

GW 2-wheel Scrapers backfilling around culvert

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GW Road Machinery is playing a highly important role in the winning of our Global War. The mechanized forces of the United Nations rely upon GW Scrapers, Bulldozers, Roadbuilders, Rippers and Tamping Rollers to clear the Way to Victory! Powerful, hydraulically-operated GW War Scrapers slice out chunks of hills, mountains, dig and haul, dump and spread all kinds of terrain, making it possible for faster building of roads, airfields, dams, and other projects, for quick, offensive advancement.

GW Scrapers have the capacity to move tremendous quantities of dirt in a short time by reason of their unique design, hydraulic action and rugged construction. **Only GW Scrapers have all these exclusive features: Spring-Lift for Lifting Load Rapidly When Needed — Integral Pump-Tank-Valve Assembly — Positive Gravity Ejection of Load — Variable Cutting Edge Angle — Power Return for Bowl and Gate — Power Down on Blade — Variable Wheelbase.**

See your nearest Allis-Chalmers Dealer.

OUR ONLY JOB *now* IS TO WIN THE WAR

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc., Detroit

WHEN YOU'RE ON A JOB THAT'S

OFF-THE-ROAD...

FOR your off-the-road jobs, Goodyear offers three big special tread tires with Goodyear's own low stretch Supertwist carcass built with multiple compound construction. They are designed for every type of terrain, every type of earth-moving equipment.

Wherever they are used, they are giving more traction, speed, and pull — taking the toughest punishment — delivering more tons longer distances before and after recapping.

Before you decide how you are going to use your tire certificate, look at Goodyear's Big Three — the Goodyear Sure-Grip for mud and marsh, the Goodyear Hard Rock Lug for rock work, and the Goodyear All-Weather Earth Mover for drawn dirt movers.

Each of these tires contains the maximum amount of live rubber allowed by the government; all are the result of Goodyear's long accumulated "know-how" in building tires that have what it takes.

THE BIG THREE (All with Goodyear multiple-compounded construction and low stretch Supertwist cord carcass)

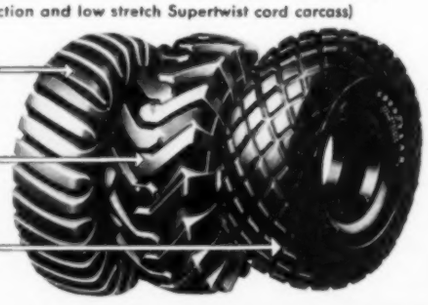
GOODYEAR **HARD ROCK LUG** for all rock work

•

GOODYEAR **SURE-GRIP** for mud and marsh

•

GOODYEAR **ALL-WEATHER EARTH-MOVER** for drawn dirt-movers



Sure-Grip, All-Weather, Supertwist—T.M.'s The Goodyear Tire & Rubber Company

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

Construction Methods

ROBERT K. TOMLIN, Editor

Volume 24 — DECEMBER, 1943 — Number 12

Small Tools ON BIG DAMS

RAISING OF FORMS for new lift of concrete at TVA's Watts Bar Dam is simplified by use of hand-operated Coffing ratchet hoists rigged on A-frames.

IN ADDITION to the many types of heavy-duty equipment, such as power shovels, tractors, cranes, pile hammers, air compressors, concrete mixers and belt conveyors, commonly employed in the construction of large dams by the Tennessee Valley Authority, a wide range of small tools and light equipment, both hand-operated and power-driven, is used. Typical of such applications is the equipment in the accompanying illustrations showing details of building Watts Bar Dam on the Tennessee River and Cherokee Dam, on the Holston River, in Tennessee. Watts Bar Dam, 97 ft. in height, is of the concrete gravity type with spillway section 930 ft. long, navigation lock, powerhouse and 1,201 ft. of earth embankment. Total length of concrete and earth portions of dam is 2,940 ft. Cherokee Dam is 175 ft. high and has total length of concrete and earth embankment sections of 6,760 ft.

One view shows how Coffing ratchet hoists of 3-ton capacity are used with the aid of A-frames to raise the wood forms behind which concrete is poured to form the blocks in which Watts Bar Dam is built. The other picture illustrates how poured concrete for each lift at Cherokee Dam is consolidated into a dense mass by the use of Jackson vibrators.

DENSE CONCRETE is assured by consolidating each pour at Cherokee Dam by use of Jackson vibrators.

U. S. Navy official photo

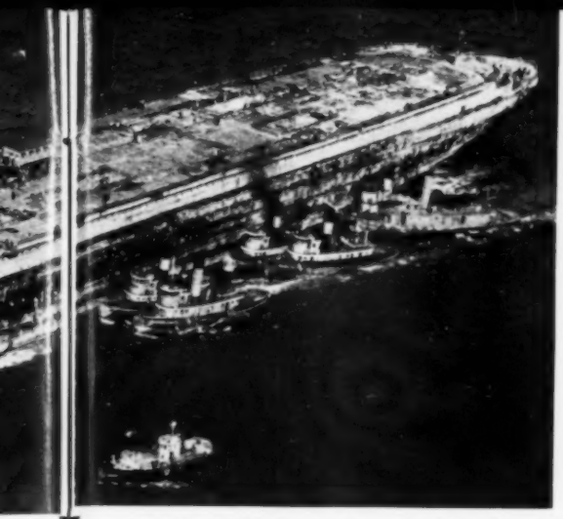
ARAB PRINCES inspect construction of 16,500-ton T-2 tankers by Marinship Corp. in Sausalito, Calif., yard as shipworkers' eyes pop to see royal representatives of Saudi Arabia's oil resources pass in native garb. In front row (left to right): General Manager W. E. WASTE; Prince AMIR FAISAL; Prince AMIR KHALID; Shaikh HAFIZ WAHBA; S. D. BECHTEL, Marinship vice president; and ABDULLA BALKHAIR.

FAST WORK WINS E for S. J. Groves & Sons Co. and Johnson, Drake & Piper, Inc., builders of Newark, N. J., Army Air Base. Accepting award from Col. A. B. JONES (right), district engineer, New York District, Corps of Engineers, are: (starting at left) BURT LARKIN, vice president, S. J. Groves & Sons Co.; JOHN V. FRANCIS, representing employees; and R. P. BAYARD, vice president, Johnson, Drake & Piper, Inc.

TO SERVE NAVY'S SHIPS mobile repair and maintenance facilities are provided by this floating drydock (below) launched at Newburgh, N. Y., yard of Chicago Bridge & Iron Co., following presentation of Army-Navy E Award for outstanding performance in wartime construction by Rear Admiral Gaylord Church.

"PRODIGIES IN CONSTRUCTION and maintenance of impossible roads over impassable country," to use words of Lieut. Gen. George S. Patton, in Sicilian campaign, mark operations of Engineer troops (below, right) who here rig line to move scout motorcycles over Axis-blasted gap in road prior to closing opening with bridge for trucks and tanks.

Press Association photo



AFLOAT AGAIN after 18 months in Hudson River mud, salvaged troop carrier U.S.S. Lafayette, former Normandie, is towed to drydock for refitting. Controlled pumping from compartments separated by watertight bulkheads (installed while ship lay half submerged on side at pier) enabled Navy salvagers and Merritt-Chapman & Scott Corp. to right 79,000-ton Lafayette, from which superstructure had been removed. Liner, to be rehabilitated for troop transportation late in 1944, sank at berth Feb. 9, 1942, as result of water poured into ship to put out fire.

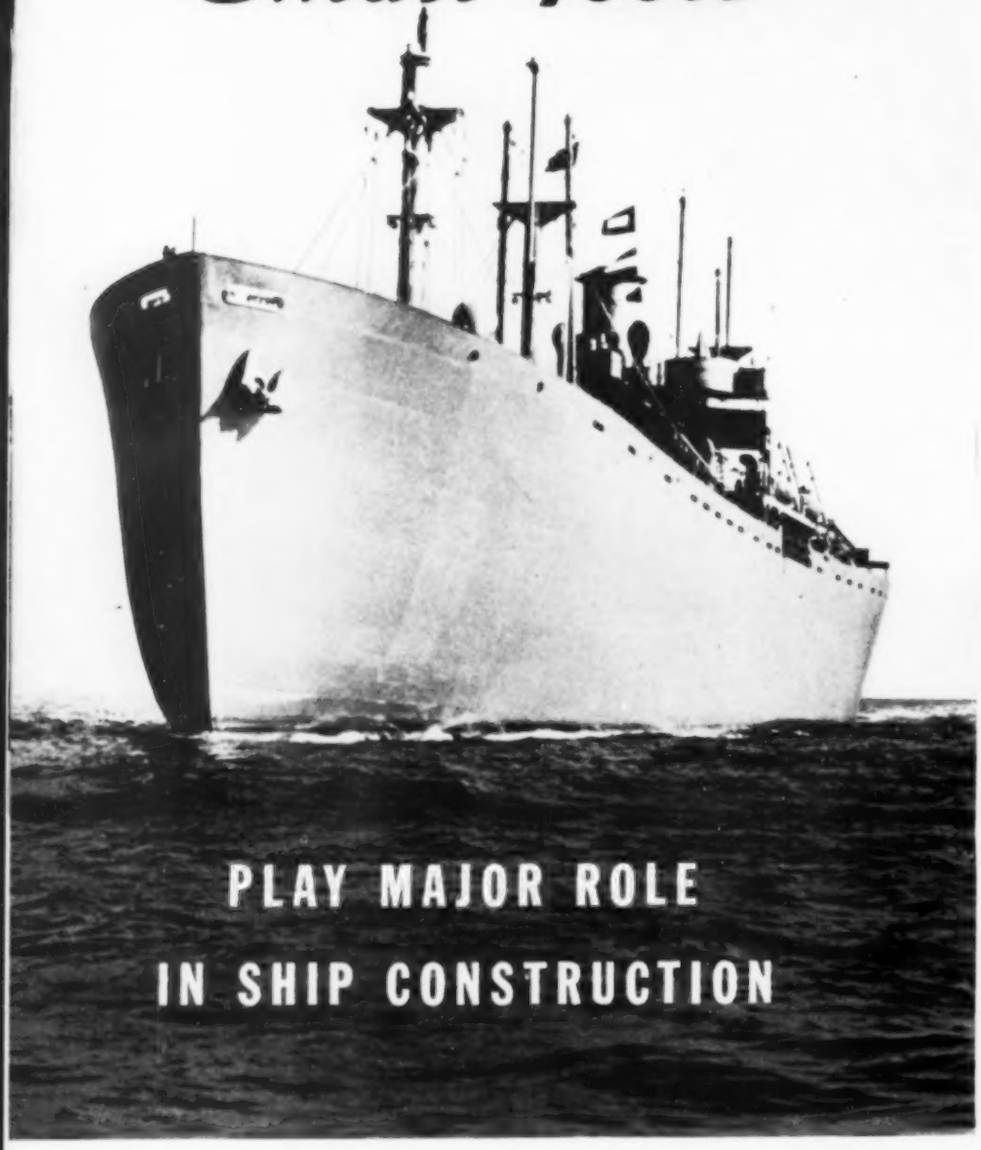
KENTUCKY DAM on Tennessee River, 22 mi. above junction with Ohio, advances nearer scheduled completion in 1944 as TVA forces place concrete in stage 2 construction area, final river section. More than 1,000,000 cu. yd. of excavation was removed in this section to make way for placing 500,000 cu. yd. of concrete. Entire project involves following yardages: earth excavation, 6,000,000; rock excavation, 600,000; earthfill, mostly in dike 1 mi. long, 4,000,000; concrete, 1,300,000. Cellular sheetpile cofferdams are installed in 60 ft. of gravel overlying bedrock.

THIS MONTH'S NEWS REEL

Acme photo

CHICAGO SUBWAY (below) goes into service as State St. line begins operation on 4.9-mi. route connecting elevated lines 3 mi. north of Loop with those 1 mi. south, thus relieving congestion of El train traffic on busy Loop tracks. Under construction for nearly 5 yr., low-level twin-tube subway has cost $34,000,000 so far. Dearborn St. line, on which work has stopped, must remain only 80 percent complete until after war. At opening ceremony (above) Mayor EDWARD KELLY cuts ribbon in presence of JOSHUA d'ESPOSITO (extreme left), PWA engineer, and PHILLIP HARRINGTON (right foreground), commissioner, Department of Subways and Superhighways.

Small Tools



PLAY MAJOR ROLE IN SHIP CONSTRUCTION

BUILDING SHIPS by modern methods, with the maximum use of prefabrication and special attention to welding, entails extensive use of small tools at Marinship Corp. yards at Sausalito, Calif. The six-way yard was built under a high-speed construction program in 1942 for the production of EC-2 ships. A special feature of the yard, where the first vessel was built with the expenditure of considerably less than 1,000,000 man-hours, is its outfitting docks 73 ft. wide whose decks are built up to ship deck level and made accessible to trucks by 5-percent ramps.

Of the 16,500 employees at Marinship, 20 percent are women and they constitute a majority of the workers in certain lines. Women take particularly well to electric welding. Applicants who pass the general requirements are accepted, without pre-

AT HER STAND (below) in Marinship welding school booth is comely Jean Smith, one of hundreds of women in ranks of shipbuilding workers.

Marinship Photos

ELECTRIC WELDING (below) is king in modern ship construction. Welders' equipment (Lincoln Electric here pictured) is everywhere on job.

FLOOR IN DOUBLE BOTTOM of vessel (below) is pulled down by Ingersoll-Rand impact wrench for attachment to keel.

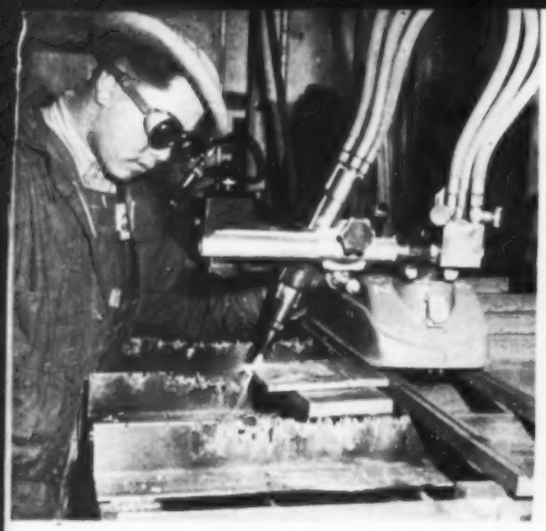
DEEP HOLES (below) through girders in new shipway deck are drilled by Ingersoll-Rand wood borer with long-shank auger bit.

ADAPTED TO MULTIPLICITY OF USES is Chicago Pneumatic surface grinder which (1, upper left) grinds engine bed foundation on steel plate in engine room floor, and (2, upper right) has wire cup knotted wheel for use as buffer in removing scales from steel plates prior to painting. Scale and dirt (3, lower left) are removed from flange of large pipe special with surface grinder which was converted into polisher and sander by replacing stone with sanding pad and disk. Standard surface grinder (4, lower right) is also used in trimming and surfacing edge of steel plate.

STUDENTS IN TRAINING use two Boyer chipping hammers, made by Chicago Pneumatic Tool Co., to cut 45-deg. bevel on plate with flat chisel.

INSTRUCTION IS GIVEN on bobbing rivets on double plate with three Boyer Superior chipping hammers.

LIGHTENING HOLES (right) are cut in steel plates with oxyacetylene hand-welding torch made by Victor Equipment Co.



SELF-PROPELLED CUTTING TORCH. Oxweld unit made by Linde Air Products Co., travels track on top of steel angle supports as it bevels 45-deg. edges on steel plate.

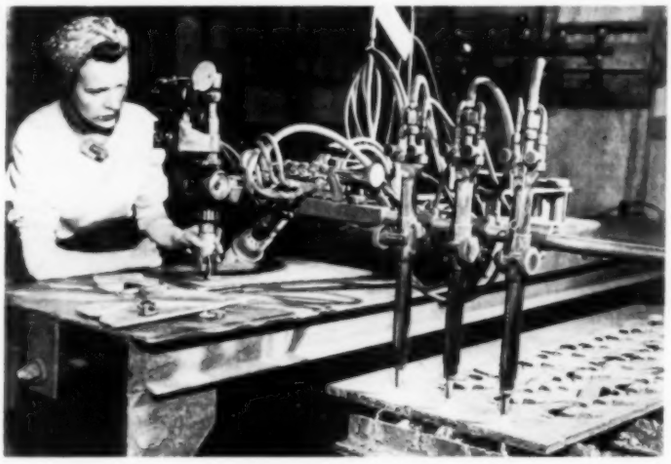
PARALLEL BARS, used extensively throughout yard, are cut with Travagraph, made by Air Reduction Co. Oxyacetylene torch in its various forms of manual and mechanical application is taking over job of cutting, beveling, trimming and shaping steel plates prior to assembly for welding operations.

vious experience, as welding trainees and are paid welding helpers' wages while they go through a 50-hr. period of preproduction instruction.

The operating management at Marinship Corp. includes: K. K. Bechtel, president; W. E. Waste, general manager; Robert Digges, administrative manager; R. L. Hamilton, production manager; Bruce Vernon, assistant to general manager; T. F. Fitzgerald, naval architect; E. B. Fox, personnel assistant to general manager; and E. J. Rising, materials manager. The officer of materials manager, something new in modern shipyard administration technique, combines purchasing, expediting, and warehousing, thus making the manager a representative, on the top management group, of the whole subject of materials and their movement into the production line. He is also responsible for the company's office in Washington, D. C., which ties in with the materials duties.

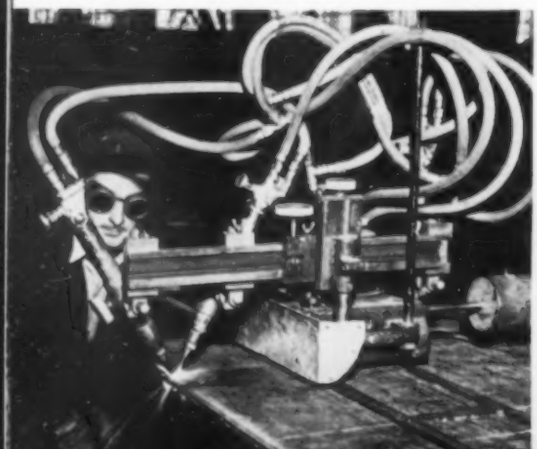
The wide range of applications of small tools at the Marinship yards is illustrated in the accompanying photographs.

CUTTING 45-DEG. BEVEL (left) is accomplished with Radiagraph, made by Air Reduction Co.



OPERATOR USES Planagraph of Air Reduction Co. (right) to control three torches which cut shapes identical to master template. In this operation worker is far enough away from torch so that no goggles are required by safety rules.

LAND CUT AND 45-DEG. BEVEL (below) are made simultaneously with Radiagraph, Air Reduction Co. product. This machine, with another torch added, can make three simultaneous cuts, two at 45-deg. angles and one land cut.



WOMAN WORKER, Laura Wilshire (below), makes straight cut with automatic cutting machine, Radiograph of Air Reduction Co. Of more than 3,000 women employed in yard, many became skillful at operating cutting torches.

WOMEN MAKE GOOD (below) even in such work as operating chipping hammer, which is considered strenuous occupation. This worker has Boyer Superior chipping hammer made by Chicago Pneumatic Tool Co.

JOB oddities

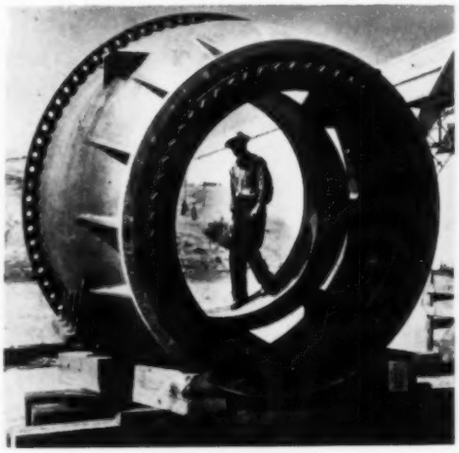
MIDGET MOTOR CAR carries GEORGE BONNELL, chief of Morrison-Knudsen Co. rail division, and L. W. ALTHOP, Union Pacific Portland division superintendent, on inspection tour of U. P. tunnel under construction at Leith, Nev.

SEABEE GREASE MONKEY (below), fulfilling implications of name, climbs out on limb in form of heavy boom of Northwest power shovel to lubricate sheave bearings.

Navy Official Photo

INSPIRATION FOR U. S. ARMY ENGINEERS building highway across New Guinea is work of art carved out of soft clay bank by one of workers. Inspecting it are COL. H. G. LAUTERBACH, (left), commander of U. S. Engineer unit, and BRIG. GEN. JENS A. DOE.

Acme Photo



LENT BY BOULDER DAM, giant casting (left) is one of three needle-valve cases destined for temporary installation on river and canal outlets through Friant Dam in California, fourth largest concrete dam in world. Shipment from Boulder Dam ended more than a year of idleness caused by WPB stop-construction order which prevented manufacture and installation of valves and other control equipment.

Bureau of Reclamation Photo

CONCRETE FUEL STORAGE TANKS (below) are installed underground by Navy in continental United States and overseas bases to offset shortage of steel plate. Tanks are sealed with Thiokol synthetic rubber "wallpaper" which, applied to concrete sidewalls, floors, and columns, protects octane rating of gasoline and forms container which remains leakproof even if concrete wall cracks.

BENCH CUTS to any desired angle of miter and bevel are made by Walker-Turner adjustable radial saw equipped with 12-in. blade and powered by 1-hp. electric motor. Unit is set up in job shop of Carl E. Erickson Co., Chicago, contractor for U. S. Engineers on large group of buildings at U. S. Army Hospital, Cleveland.

TRANSFERRED FROM JOB SHOP to new location inside partially completed building, 3-hp. electric-motor-driven Monarch radial saw, capable of making all types of angle cuts, operates 14-in. blade in cutting lumber up to 4-in. size.

AREA ENGINEER directing work for Corps of Engineers, Pittsburgh District, on U. S. Army Hospital, Cleveland, and other projects in northern Ohio is **Maj. A. H. McCARNES** (left), whose area office is at hospital site. **EXECUTIVE OFFICER** for U. S. Engineers in area engineer's office at U. S. Army Hospital, Cleveland, is **Capt. J. H. BEAUCHAMP** (right), whose civilian experience includes eight years as superintendent with Dravo Corp., Pittsburgh, and six years as chief of maintenance for Pittsburgh District, Corps of Engineers.

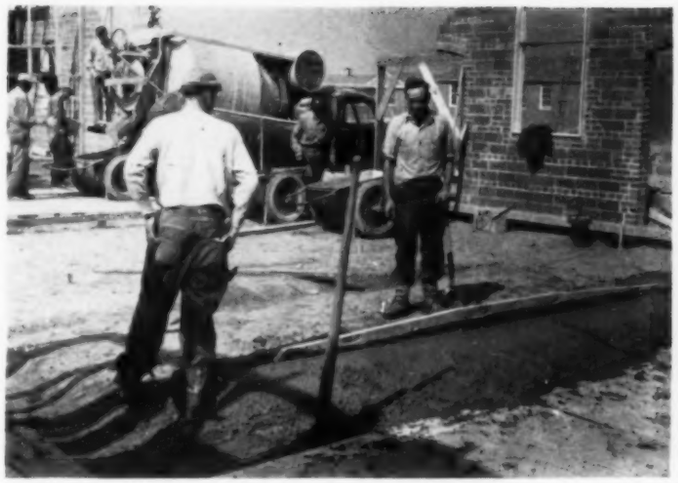
Power Tools

SPEED WORK ON ARMY HOSPITAL

POWER-OPERATED BENCH MACHINES and portable hand tools expedited construction work by the Carl E. Erickson Co., Chicago, in completing on schedule, despite a manpower shortage, the largest of three groups of buildings for a 1,727-bed U. S. Army Hospital constructed under the direction of the U. S. Engineers about 10 mi. south of the business center of Cleveland, Ohio. The hospital comprises 90 buildings having monolithic concrete foundations, brick-and-tile load-bearing exterior walls and wood-frame interior partitions and roofs. Except for two-story officers' quarters, nurses' quarters and administration building, the hospital buildings are one-story height. The floors are of wood-joist construction, with finish

GUMMING TEETH of worn circular rip-saw blade. Ace-Line 3-hp. electric grinder is equipped with $\frac{1}{16}$-in. emery wheel. To gum (enlarge spaces between) teeth of smaller blades for portable power hand saws, grinder operates wheels as thin as $\frac{1}{32}$ in.

TO DRILL AND GROOVE wood framing members for bolts and timber connectors, Carl E. Erickson Co., operates Delta 1-hp. electric drill press equipped with bit and routing tool. After being cut and marked, pieces for roof trusses are drilled by this press.



CONCRETE FLOOR in mess hall is 4-in. non-reinforced slab, with thickened edges at expansion joints, placed on hand-tamped sand fill and struck off with hand screed. Truck-mixers deliver ready-mixed concrete to hand carts. In exterior walls, note brick headers tying brick facing to tile backup.

TIMBER TRUSSES fabricated on job with split-ring connectors span 44 ft. 2 in. clear distance between walls of recreation building at U. S. Army Hospital. Temporary work benches are set up in building to cut secondary framing and prepare materials for mechanical installations.

flooring of "Victory" oak except in some units where yellow pine had to be substituted to fill out a shortage in flooring.

Among the one-story buildings are 28 wards 297x30 ft. in plan. Inclosed masonry-wall corridors connect all buildings which house patients and personnel. These buildings have gable roofs framed with job-fabricated trusses. Flat roofs are used on warehouses.

Construction of the hospital, involving an expenditure of several million dollars, was divided into three areas to speed the award of contracts. Erickson's contract, the largest of three building contracts, amounted to about one-third of the total construction cost. Other building contracts were completed within specified time limits by the Welso Construction Co., Chicago, and Curro Construction Co., Cleveland, using power tools of types similar to those employed by Erickson.

DRIVING POINTS (right) are quickly cut on 2x4-in. stakes by Speedmatic 3/4 hp. electric saw, equipped with 8-in. blade.

IMPROVISED TRACK on temporary work bench speeds operation of ¾-hp. electric Skilsaw with 8-in. blade in making cross cuts in 2x4's. Wooden track, lightly greased, is mounted at right angles to stops against which stock is held while being cut across grain. Bench and saw track are set up in recreation building during construction.

COMPACTING BACKFILL adjacent to foundation wall. Cleveland pneumatic tamper of 30-lb. weight and 50-in. overall length, with 5⅜-in.-dia. striking butt, is powered by air at 90-lb. pressure from Sullivan 105-cfm. portable compressor capable of running four tampers. Carl E. Erickson Co. operates two units at U. S. Army Hospital.

COMBINATION UNIT powered by one gasoline engine of about 20 hp. comprises CH&E table saw, here cutting 2x4's, and band saw, in background, which can be operated simultaneously with table saw. WILLIAM UHNICK, mayor of Parma Heights, Ohio, responding to call for war workers after 20 years in other activities, operates saw unit.

THE JOB JESTER

CARTOONS DRAWN FOR CONSTRUCTION METHODS

"Psst, Hank! Swing that mistletoe over in this direction!"

"He used to be in vaudeville!"

"There's the life for ya! ... Just sittin' around all day!"

Steel Pipe Reconditioned

For Re-Use as Water Main to Save Critical Materials

REFINISHED PIPES are held in storage yard ready for use. Part of plant where reconditioning operations are carried on is shown in background.

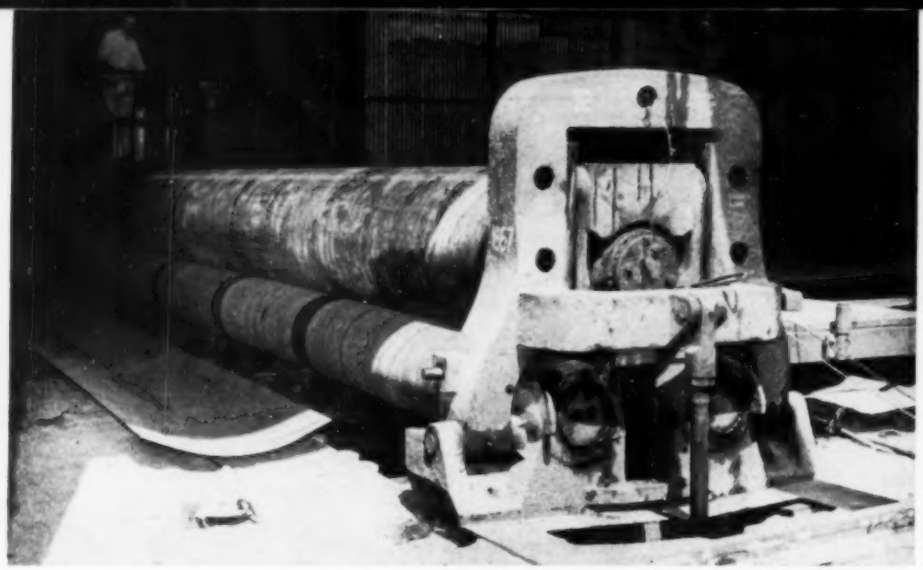
DUG UP AND RECONDITIONED after almost 10 yr. of service, 11 mi. of 36-in. steel pipeline is providing 90 percent of the pipe for a water main extension from Santa Ana, Calif., to Corona del Mar on the South Coast. Removal of the old pipe sections from the trench (as described in CONSTRUCTION METHODS for July, 1943, p. 74) hauling and reconditioning was done by the American Pipe & Construction Co., for which F. F. Jenkins is general superintendent, under contract with the Metropolitan Water District of Southern California, with Julian Hinds as general manager and chief engineer. The same company will lay the pipe in the new trench at the new location.

From the site where they were originally laid by the city of Pasadena to carry water from the Morris reservoir, the 30-ft. pipe sections were trucked to the reconditioning yard on the outskirts of Los Angeles. Here 150 men were employed for four months in reconditioning operations that included cleaning, trimming up, re-rolling, re-belling, shot-blasting, welding up worn spots such as pit marks, applying enamel coatings inside and out and applying two exterior coats of shotcrete.

1 **BURNING OPERATIONS** (below) remove old asphaltic lining and coating material, as foreman encourages fire with nozzle that sprays distillate and restrains it with water jet. Pipe is rolled on metal supports as necessary to keep fire moving along coating and particularly to prevent "hot spots" in which heat might be so great as to damage metal.

2 **PIPE ENDS** are squared and trued with job-made machine that rotates arm with cutting tool at each end. "Vertical milling machine" squares pipe end after section has been placed on mandrel which expands to steady and support section at desired height in front of milling machine which has motor-driven arm.

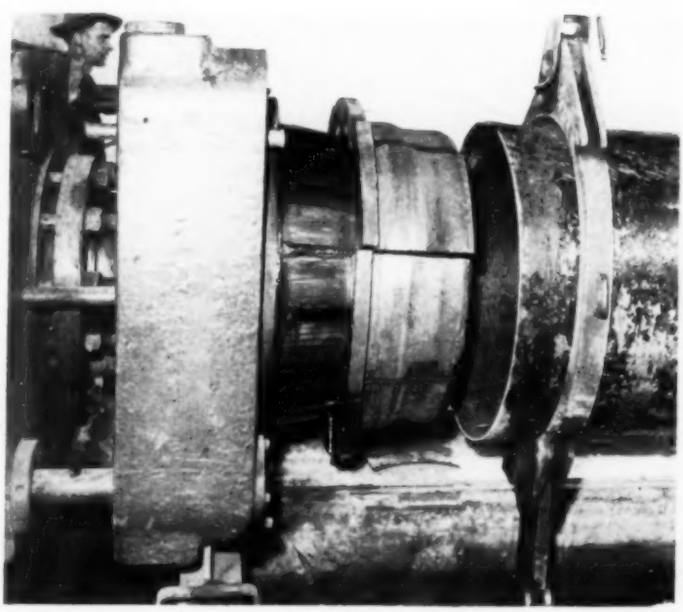
3 COMPRESSED AIR GRINDER smooths off any burr that remains on inside or outside of pipe after completion of milling operation.



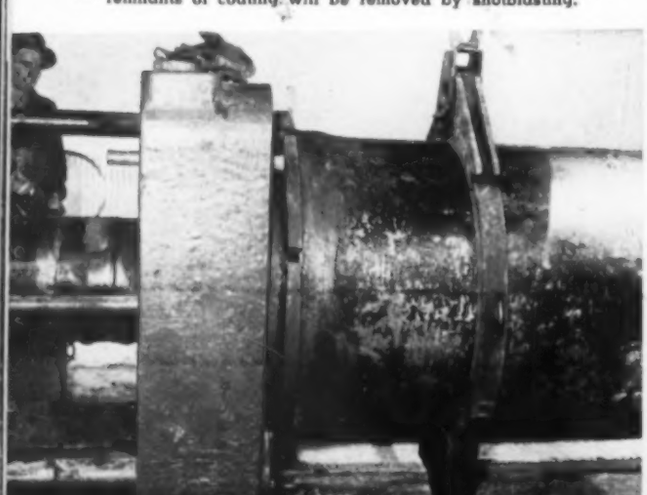
4 SET OF ROLLS, such as was used for initial curving of plates, is employed to re-roll sections that are out of round, dented, or slightly bent. Considerable skill on part of operator is required and even so re-rolling is sometimes tedious operation.

5 NEW SPIGOT RING (left) is welded on one end of each section. Ring is exactly sized and shaped on hydraulic press and put on with particular care to maintain exact alignment. On pipe section whose plate thickness is 5/15 in., two welds, one inside and one outside, are used.

6 HEAD THAT FORMS new bell on pipe section is ready for entry into pipe. After insertion head is expanded by hydraulic jacks to form bell.

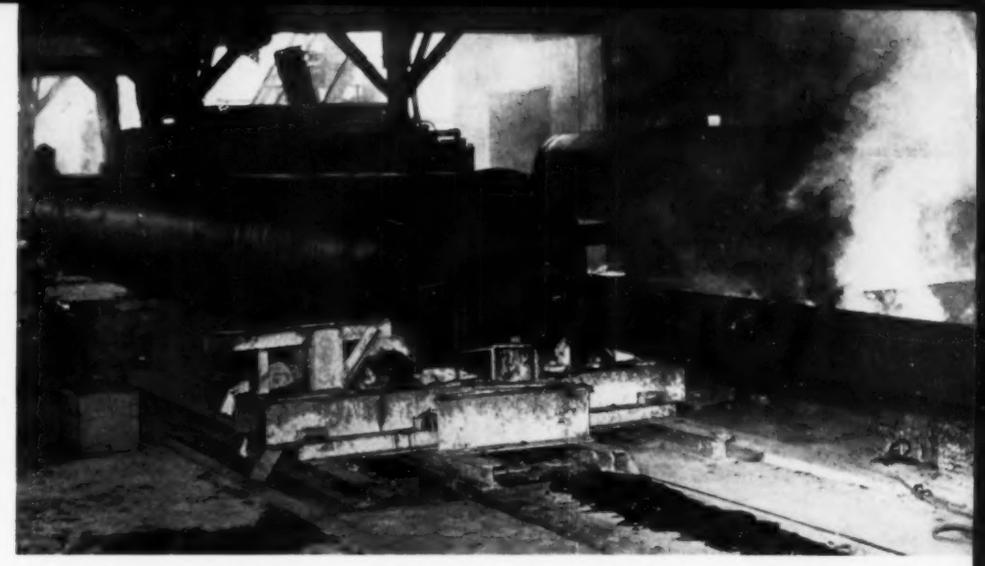


7 NEWLY FORMED BELL (below) is shown after external collar with its toggle joint has been released. Charred remnants of coating will be removed by shotblasting.

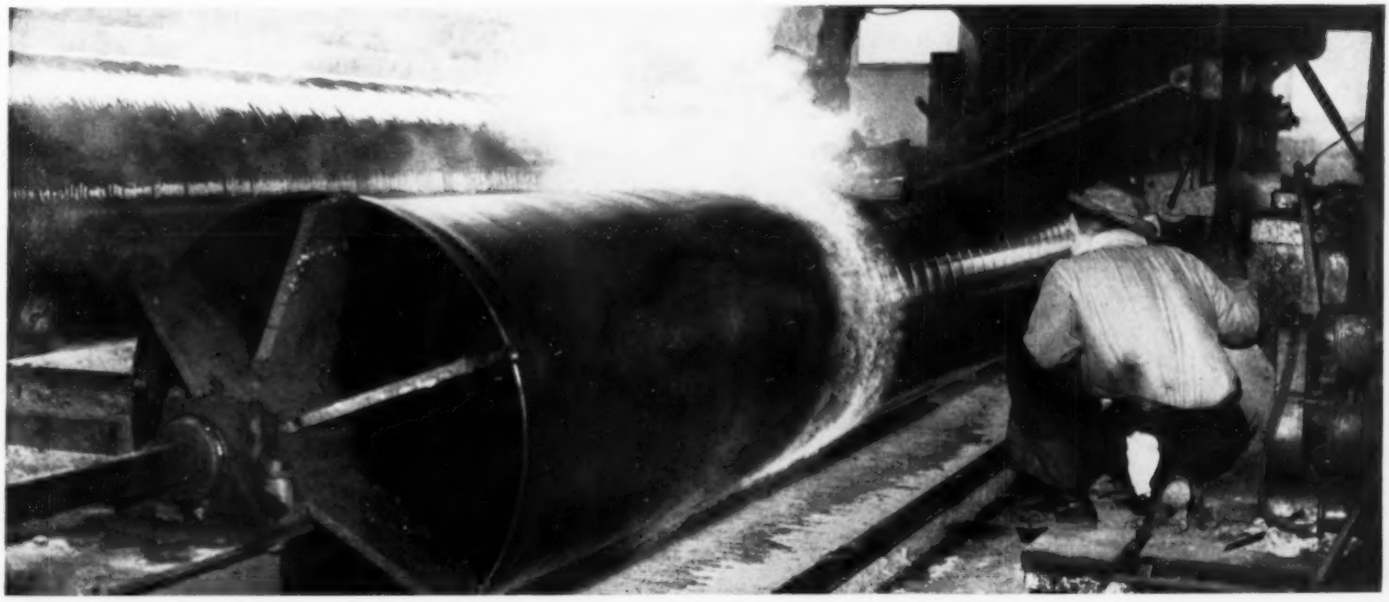


8 WELD METAL IN PITS (below) is ground back to thickness of adjoining plate by worker at left. Welding to build up spots where corrosion caused pittings, as deep as 1/8 in. in few cases, follows shot-blasting operation.

9 **COAL-TAR PRIMING COAT** is applied on outer surface of pipe. This operation precedes application of coal-tar enamel.

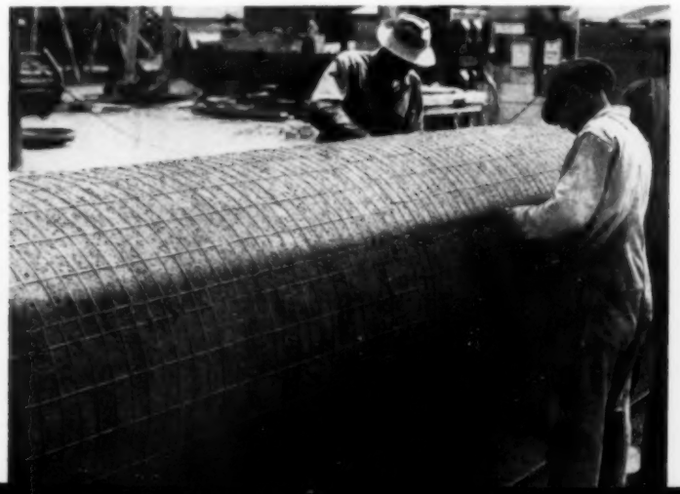


10 **TWO FEEDER TROUGHS**, each 15 ft. long, containing hot enamel for interior lining, are thrust into slowly rotating pipe section from opposite ends. Each trough extends half way through section and they are emptied, simultaneously to avoid unevenness at juncture point.

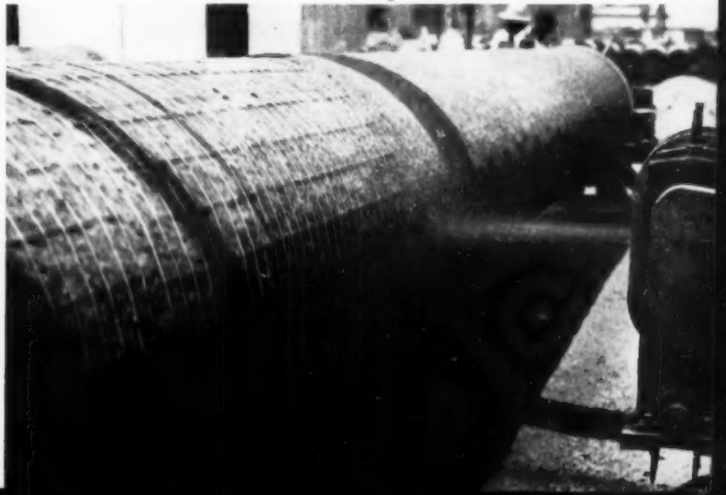


11 **EXTERIOR ENAMEL COATING** is applied in jet delivered from carriage moving length of section while pipe rotates. Operator controls speed of rotation, rate of travel and quantity of flow so that desired coating can be put on in one round trip of carriage.

12 **WELDED STEEL WIRE MESH** (below) is wrapped over initial protective coating of shotcrete. Over this goes second shotcrete coat. In this operation, one-half circumference of section is covered at one time, then turned and other half completed.



13 **BRUSH COATING MACHINE** puts on second mortar layer to cover steel mesh for minimum depth of 1/2 in. Two cylindrical brushes rotate just outside nozzle through which shotcrete is forced in form of jet against rotating pipe section.



Three Saws Combined

CUT BARGE TIMBERS IN SINGLE PASS

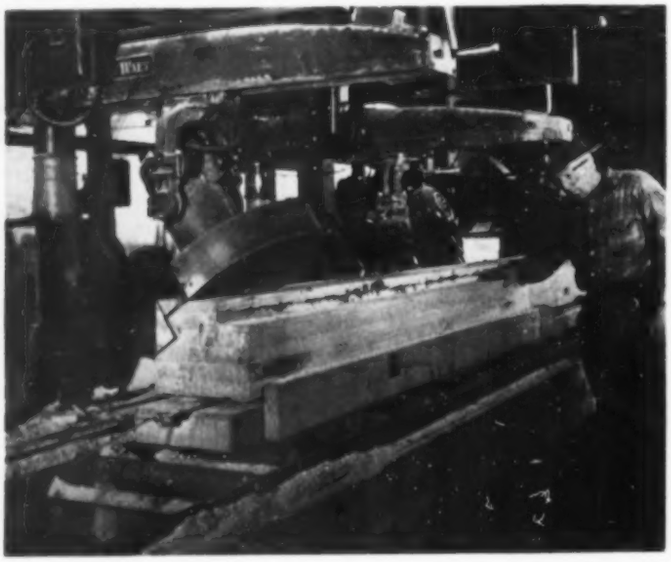
SPECIALLY CUT, assembled sill timbers, are here shown with two faces adjoining special cuts finished to size.

IN A CONTRACT for 1,000 prefabricated barges which Timber Structures, Inc., of Portland, Ore., undertook to build for the government, it was necessary to provide timber sills of a cross-sectional shape that could be made only by three saw cuts if the member was to be made of stock timber sizes.

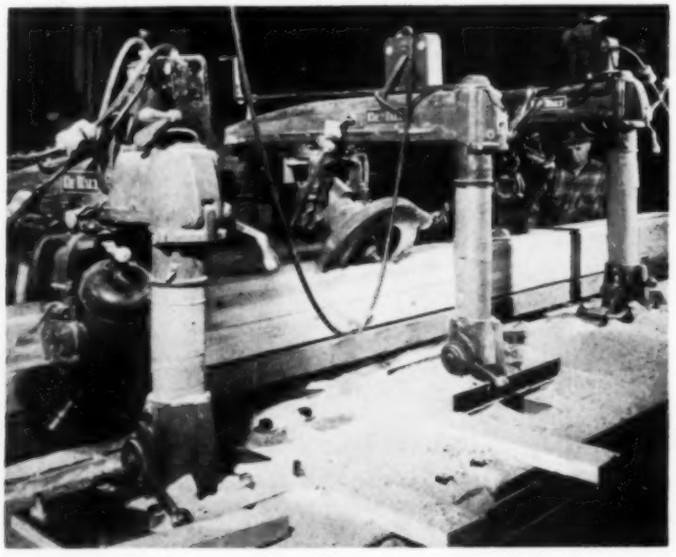
The member, accordingly, was built up with high temperature setting phenolic glue which has high waterproof qualities. After being built up to the necessary size, the assembled timbers were then passed through a group of three DeWalt circular saws so arranged that all three of the cuts could be made in a single operation. This saved a great amount of time in fabrication and assured absolute accuracy and uniformity in all of the pieces that went through the saws. All three of the saws have a power rating of 7½ hp.

In these pictures the pieces are actually being cut in the saw combination but while the exposure was being made, the advance of the carriage was stopped; otherwise, flying sawdust prevented a clear view of just what the arrangement is.

The member being cut travels through the saws on a small carriage mounted on a track guide and roll case. Power for advancing the member at a uniform speed through the saws is provided by a small motor-driven winch.

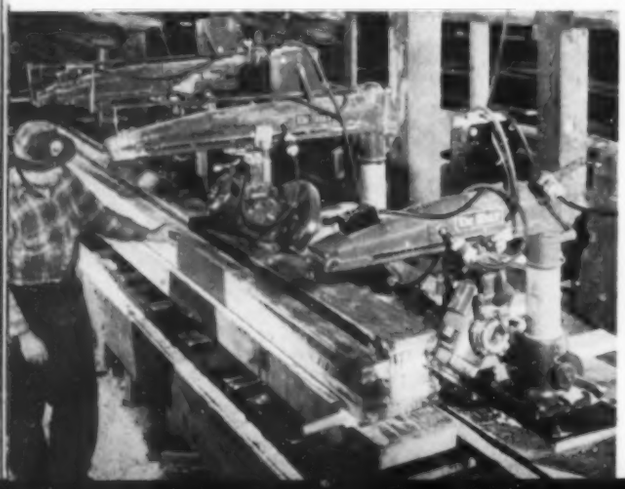


END VIEW OF SILL TIMBER after three cuts have been started. Note track guide and cable for advancing assembly.

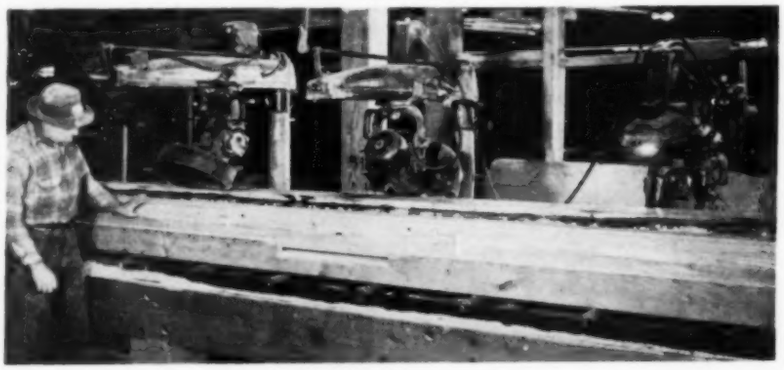


SAW AT LEFT is making first cut, which is at right angles to one which follows it.

FIRST SAW (below), at right, is just emerging from assembled timber. Note sequence of saw arrangement and how well adjustable mounting serves.



ONCE STARTED CORRECTLY, piece of glued timber (below) travels through saws with only general supervision required of operator.



Small Tools on Construction

A Special Pictorial Section Illustrating Scores of On-the-Job Applications of Hand-Operated and Power-Driven Tools for Engineers and Contractors.

SPIKES ARE RAPIDLY DRIVEN in rake planking of wood barge by hard-hitting Black & Decker portable electric hammer. Striking 1950 blows per minute, this tool, with a weight of 24 lb. and a length of 20¼ in., hammers home ½ x 8-in. spikes.

Construction to serve the war effort during the last two years has vastly extended the range of use of small tools of all types by contractors and engineers. While every large-scale project demands for its rapid and efficient prosecution a full quota of heavy-duty equipment — power shovels, cranes, tractors, trucks, concrete mixers, air compressors, pile drivers, hoists and other large machines — it likewise offers scores of opportunities for the effective application of small tools, both hand-operated and power-driven.

In the prefabricated and assembly-line methods that have, of late, been applied with profit to construction — notably in mass housing, industrial plant building and in ship-building — small tools have been playing a vital role. Individually, the light-duty operations on any large job appear to be of secondary importance, but in the aggregate they bulk large. Witness the vast amount of precutting and boring of timber with light power-tools on housing projects and in the pre-fabrication of timber trusses for war industry plants and the Navy's blimp hangars.

Any intelligent functional analysis of the work required on a construction job will indicate the need of equipment for both heavy-duty and light-duty operations. Under the first classification are such functions as excavation and earth-moving, concrete mixing and placing and the transport and handling of materials into place. Under the second head there is a wide range of functions, such as sawing, boring, drilling, hammering, bolting, cutting, threading, bending, grinding, welding, surfacing, vibrating, jacking, pulling, pushing, tamping — which small tools are ideally suited to perform.

Not so long ago construction men performed many of these light-duty operations by slow and costly hand labor. Today, however, there are available for use on construction projects a variety of improved, portable tools, powered by electric motor, gas engine or compressed air, that can accomplish their tasks in only a fraction of the time and at much lower cost than formerly. It is the purpose of the text and illustrations in this issue of *Construction Methods* to indicate the broad scope of operations essential to present-day construction that can be done effectively with small tools.

Small Tools on Construction

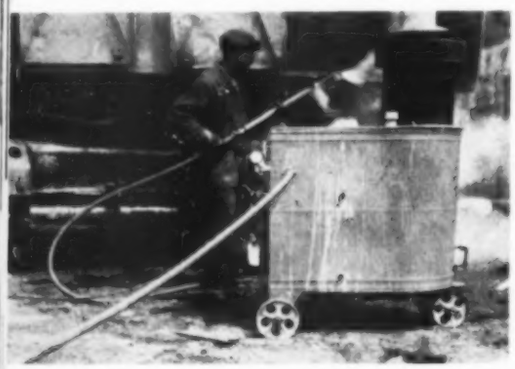
STAKES FOR ANCHORING STEEL FORMS on concrete paving job on Lackawanna Trail in Pennsylvania are driven rapidly by using Cleveland pneumatic rock drill equipped with flared hollow bit to fit over top of stake.

TRACTOR OVERHAULING JOB involves use of Black & Decker nut runner for disassembling and reassembling machine parts.

INTERNAL VIBRATION OF CONCRETE poured in slab from two-wheel buggy is accomplished with swivel mounted, variable-speed, Mall portable gasoline engine power unit, light enough to be handled by one man and connected by flexible shaft to vibrator head operating at frequencies of from 3,000 to 7,000 per minute.

CONCRETE FORM MARKS on large pier (above) are removed and surface is finished with Ingersoll-Rand pneumatically powered grinders equipped with abrasive disks.

RAILWAY TRACK MAINTENANCE is facilitated by use of Jackson electrically-powered vibratory tie-tampers (below) served by portable gas-electric plant. Different types of interchangeable tamping blades and tips are available for different kinds of ballast material from light, sandy gravels to chatt, crushed slag or rock. Rotor element of tool delivers vibratory blow of 650 lb. at operating frequency of 3,700 rpm.

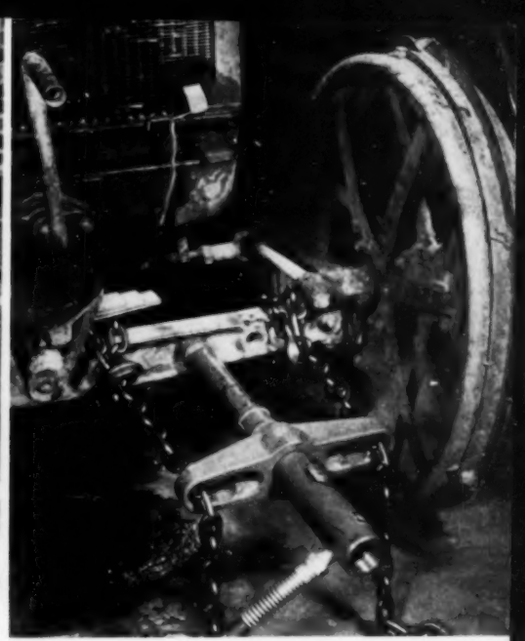


FOR CLEANING CONSTRUCTION EQUIPMENT of dirt and grease, this Hypressure Jenny (left) made by Homestead Valve Mfg. Co., using steam jet, proves useful in reducing maintenance costs and preparing surfaces for repainting.

STEEL TAPE RULE (below) of Lufkin make is applicable to different kinds of short measurements, including straight measurement of diameter (left); curved measurement of pipe circumference (center); and angular measurement for electrical conduit installation (right). Tape blade is stiffened by concave forming so that it can be projected unsupported.

BREAKING OUT CONCRETE PAVEMENT to provide for laying of new service main by utility company is done with Chicago Pneumatic demolition tool.

FOR CUTTING AND THREADING PIPE in diameters from ½ to 2 in. this Beaver Model A heavy-duty machine is equipped with adjustable opening dieheads and dual automatic oiling system.



TRACTOR AXLE IS STRAIGHTENED by use of Blackhawk 10-ton Porto-Power hydraulic jack, here rigged to exert pull. Power is supplied by hand pump which transmits oil under pressure to ram that may be coupled with pulling attachments.

EXTENSIBLE COLUMN MOUNTING facilitates operation of electrical hand drill (above) used at Todd Shipyards for forming holes in overhead plates. Device was developed by Evert Dustman, one of workers. Column is adjustable in height and is controlled by foot pedal.

International News Photo

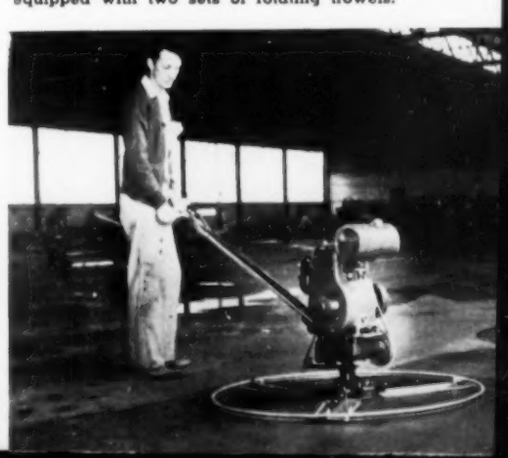
EQUIPPED WITH 10½-IN. BLADE this Porter-Cable Speedmatic hand saw is powered by 1¼-hp. universal a.c.-d.c. electric motor. It has cutting depth of 3¾ in. and is here shown trimming series of form braces to proper length.

PNEUMATIC CHAIN SAW of Disston make powered by 3½-hp. air motor has cutting capacity of 20-24 in. and uses 90 cu. ft. of air per minute at 90-lb. pressure.

ALL-STEEL TOOL BOX (left) of Littleford manufacture, mounted as trailer on pneumatic-tired wheels, has sliding shelf divided into compartments varying from 4x6½ in. to 8x26 in. Space for first-aid kits, records, files and various small fittings and hand tools is provided in shelf. Brackets and lugs hold saws, axes and other hand tools. Patented locking device makes tool box thief-proof. Covers can be held open by safety catch. Side shelves provide work bench on job.

FIELD LUBRICATION of construction equipment is made possible by this Graco Convoy Luber (below), self-contained, air-operated unit mounted on truck chassis Equipment includes 12-cu. ft. air compressor powered by 4½-hp. air-cooled gas engine supplying 35-gal. storage tank. Thirty-ft. lengths of ⅜-in. hose were carried on reels delivering lubricants from tanks to machine being serviced.

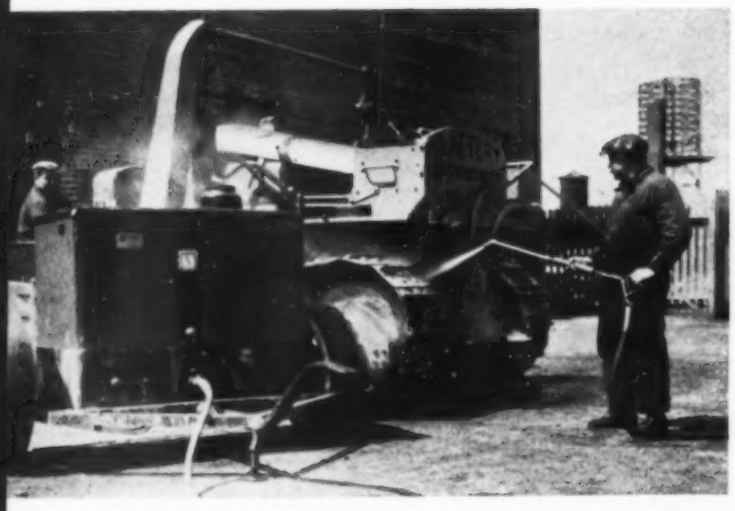
CONCRETE FLOOR FINISH in industrial plant (below) is done with Whiteman finishing machine powered by 2-3-hp. gasoline engine. Unit is equipped with two sets of rotating trowels.



Small Tools on Construction

PORTABLE ELECTRIC HAMMER of Syntron make is used to cut out old concrete in wall and in large cracks. As soon as old concrete is cut out, following step is to refill holes with cement.

PORTABLE ELECTRIC GENERATOR operates Porter-Cable Speedmatic hand saw at building site where commercial electric current is not available. Saw with 7½-in.-dia. blade and ¾-hp. universal a.c.-d.c. motor is here shown cutting 2x8-in. rafters.

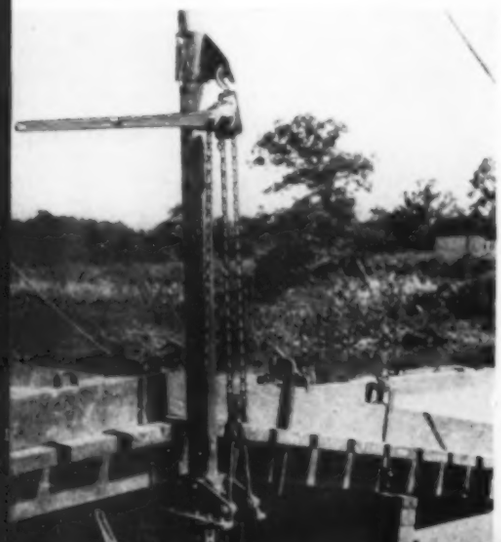


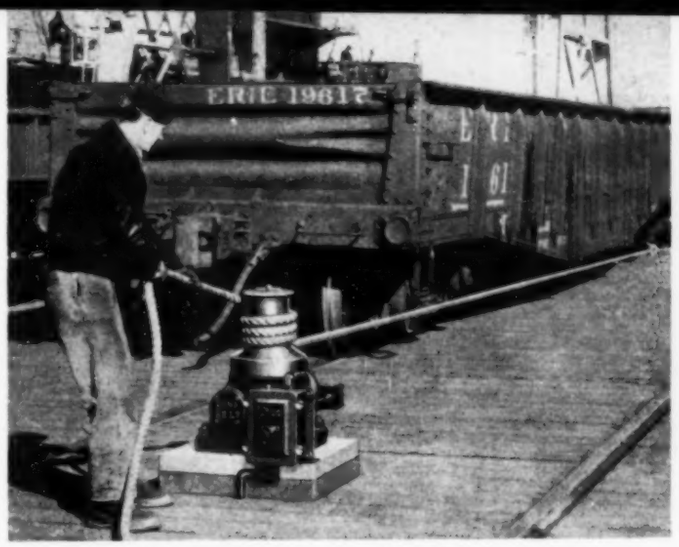
EQUIPMENT MAINTENANCE in yard of Slattery Contracting Co., Woodside, L. I., New York, is aided by use of Kerrick Kleaner, here shown removing dirt and grease from tractor.

ELECTRIC TREE FALLER is powered by 10-hp. motor weighing only 32 lb. Cutter chain tightener on Atkins-Hassler tool assures even tension on chain regardless of type of sawing being done. Instead of forcing sawdust ahead of raker teeth, this saw, equipped with cutter and router teeth, cuts shavings similar to those made by planer. Use of depth gage teeth prevents chatter or tipping teeth as they pass through cut.

CHAIN HOIST (below) of Coffing manufacture is employed on construction of temporary bridge. Weighing 74 lb., hoist is convertible and can be used as double chain 3-ton hoist with 57-in. lift or as single chain 1½-ton hoist with 112-in. lift.

LAG SCREWS to hold in place main line heavy-duty rails on Norfolk & Western Railroad are driven into wood ties by gang using Black & Decker ¾-in. drills and special lag-screw drivers powered by portable electric generating plant near railroad track.

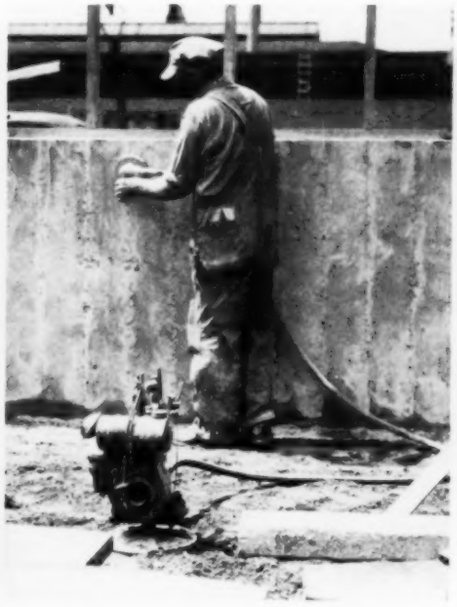




ELECTRIC CAR SPOTTER is useful piece of equipment on Baltimore & Ohio railroad pier in Maryland. Link-Belt vertical-capstan units are made in 5,000 and 10,000-lb. starting pull capacities. These units are designed to conserve manpower and to eliminate switching charges and delay. Electric motor is integral part of unit.

COLD-WEATHER CONCRETING is made possible by use of Aeroil equipment, including water heater, at left, and oil-burning torch installed in mouth of ½-yd. concrete mixer. By this means, concrete can be mixed and kept warm enough so that it can be poured even when thermometer drops to low temperatures encountered in wintertime.

JOINTS IN STEEL ROOF TRUSS are made with aid of Cleveland riveter. This tool has a capacity up to ⅞-in. rivets and weighs 19½ lb.



SMOOTH FINISH on concrete wall is obtained by removing form marks with Mall abrasive disk grinder powered by 1½-hp. gasoline engine.

HATCH COVERS FOR CONCRETE BARGES at shipyard of Barrett & Hilp, San Francisco contractors, are rapidly painted with DeVilbiss spray gun.

HOLES ARE DUG rapidly by this Buda earth auger (below) mounted on rear end of truck so that equipment can be shifted quickly and easily from one set-up to another.

NOTCHING OF JOINTS (below) on timber framework of building is done by Skilsaw groover unit adapted to cutting grooves and mortices and speeding up rabbetting.

FOR BOLTING SEGMENTAL RINGS (below) of cast-iron lining for Brooklyn-Battery subaqueous tunnel, New York City, sandhogs of George H. Flinn Corp. use long-handled Lowell reversible ratchet wrench.

Small Tools on Construction

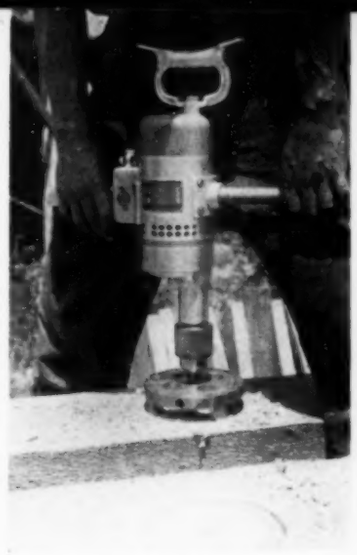
JOURNAL JACKS of Buda make are here being used to carry elevated railway columns during underpinning operation made necessary by excavation underneath street.

STEEL PIPE IS BENT in one operation, without heating or filling, with Tal's Prestal hydraulic portable bender, designed for use on 2½- and 3-in. pipe. Weighing, with 2-in. former, 98 lb., equipment requires no bolting, bench or table. Range of bending formers permits quick changeover for pipe sizes from ⅜ to 3 in. Adapted also to bending mild steel bars from ⅜ to 2 in. in diameter. Bends up to approximately 180 deg. in one operation by pumping on handle operating hydraulic cylinder.

HEAD PROTECTION on construction work is afforded by Skullgards, laminated Bakelite hats supplied by Mine Safety Appliances Co. Hats are light in weight and are moisture proof.

BUILDING MATERIALS (below) in wheelbarrow or on platform are raised to roof by Yale & Towne electric hoist.

PORTABLE VIBRATOR (below), with motor hung from shoulder of workman by strap and pad, consolidates concrete poured for pavement slab on Kentucky state highway. This Berg ½-hp. motor unit weighs only 15 lb. while vibrator unit, weighing 11 lb., is attached to 5-ft. flexible shaft and casing.



INSTALLATION OF TIMBER CONNECTORS of Teco split-ring type requires boring and grooving with power tools. Photos show, left, Stanley electric drill cutting 6-in. circular groove; center, fitting split rings into joint; right, boring bolt holes with vertical post drill.

SHANK EXTENSIONS on Bonney ratchet-handle socket wrench enable workman to tighten nut on anchor bolt of trash-rack beam in Mill Creek pumping station of Cincinnati flood-control project being built by Ford J. Rogers Construction Co. and La Crosse Dredging Corp., Minneapolis, for U. S. Army Engineers.

PULLING NAILS is made easy with this Crescent Red Devil tool. With puller held at angle and jaws positioned to straddle nail head, rammer is driven down with sufficient force to embed jaws for grip below nail head. Handle then is pulled toward user, closing jaws and lifting nail in single rapid movements.

THERMAL INSULATION is applied to underside of corrugated metal roof by Sprayo-Flake process, using special air gun to eject dry fibrous materials simultaneously with an atomized adhesive. Adhesive primes surface to be treated and coats fibers as they leave air-gun nozzle, causing them to build up in lightweight, cellular blanket.

ONE-INCH RIBBON OF GLUE (below) is applied to wood frame of floor assembly by Laucks "gun" prior to placing plywood panel to make complete covered floor unit. Barrel of gun, 30 in. long, 2½ in. in diameter, and weighing 15 lb., filled, carries 2 qt. of construction glue, enough to spread a 1-in. glue line in 400 lin. ft. of studding.

SELF-PROPELLED CUTTING TORCH (below) of National Cylinder Gas Co. cuts steel plate with oxyacetylene flame from No. 2 tip in equipment repair and maintenance shop of Geo. M. Brewster & Son Co., contractor, Bogota, N. J. Electric-motor-driven machine travels steel channel track at speed regulated by hand in accordance with stock being cut.

Small Tools on Construction

SQUARE-END PIPE CUTTER of Beaver make uses pair of spring-fed knives to cut pipe without leaving burr to be reamed. Cutting range is from ½-2-in. dia. pipe. Cutting time for 2-in. pipe is 30 sec.

HEAVY-DUTY CONSTRUCTION JACK has narrow base to permit insertion between railway ties. This Simplex jack has capacity of 15 tons and base width of 3⅞- or 5-in. Lifts or pushes on rotating cap, on corrugated toe-lift, on auxiliary cap shoe or from any height by using chain which is supplied as sling.

FOR JOINTING PIPE firm grip is assured by this Walworth Parmelee wrench which leaves no grooves or scars on pipe surface. These wrenches are used on pipes of ⅜-4-in. dia. Particularly suitable for close quarter work.

DEEP SEWER TRENCH is braced with aid of Simplex trench braces. Ball-and-socket joints at either end permit quick adjustment to any angle. By using proper length of pipe, braces are adaptable to varying widths of trench.

ELECTRIC FLOOD LIGHT and pair of hand saws are supplied with electric power by Homelite portable generator driven by gasoline engine.

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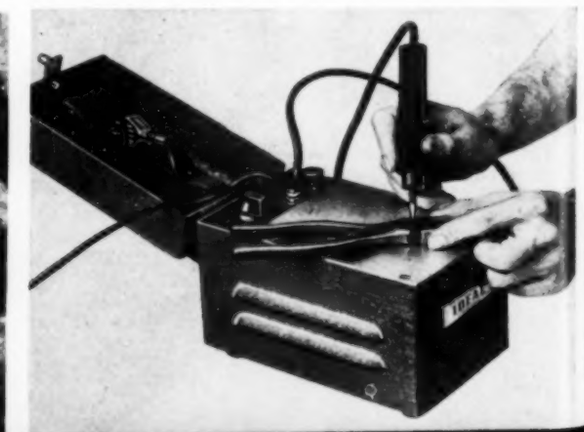
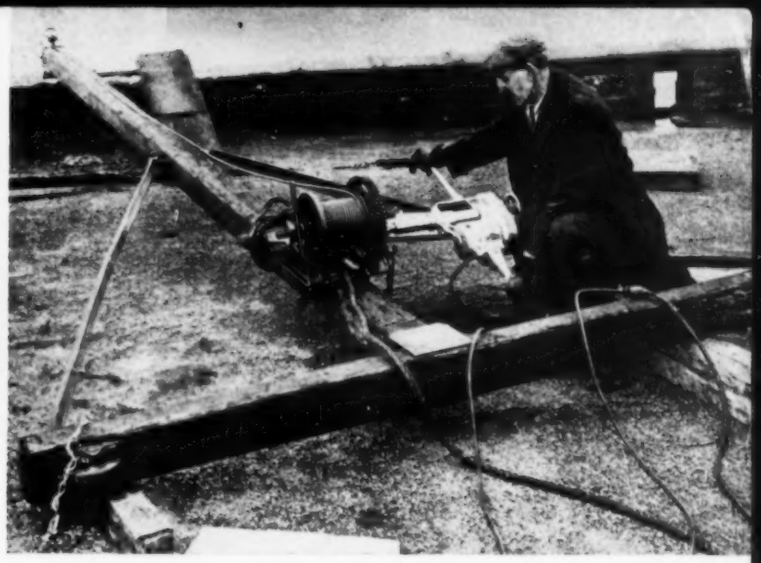
BENCH DRILL STAND (below) mounts ¾-in. Van Dorn electric drill, here equipped with special routing tool to cut depressions for shear plate connectors in triangular pieces to be used in timber craneway structure.

PAIR OF RATCHET WRENCHES (below) makes quick work of tightening up bolts on 3-in. Dresser pipe coupling. These wrenches are only tools required to complete pipe joint. With them, unskilled labor can make tight flexible connections on all types of pipelines.

FOR MARKING TOOLS for identification and to guard against theft, this Ideal electric etcher is useful piece of equipment. Regardless of hardness of metal, etcher burns right into surface, making smooth and permanent mark. Depth of mark is controlled by speed of writing. Equipment operates on 115-v., 50-60-cycle electric current.

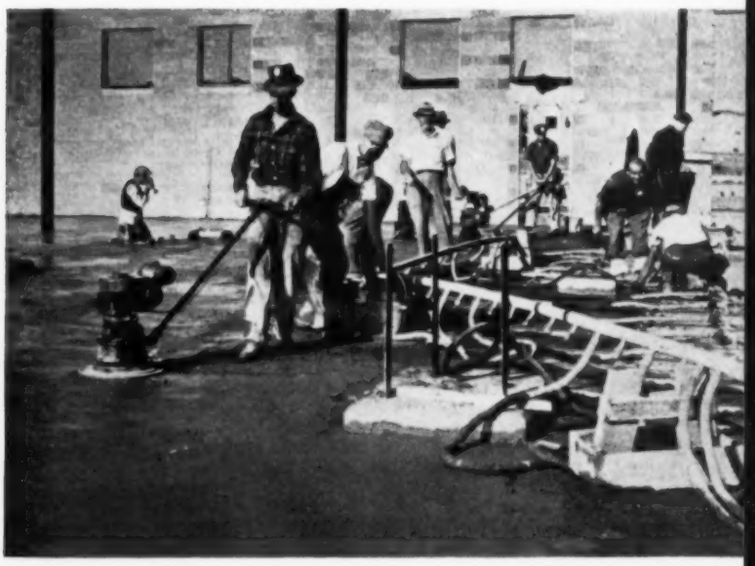


ACCESSORY TOOLS for job repairs are mounted on portable welding outfit of L. A. Davidson, Lansing, Mich., contractor for Michigan State Highway Department on Detroit Industrial Expressway, where **KENNETH E. DAVIDSON** (with hand on machine) is project manager. Attached to steel bench at rear of chassis are Parker vise and Trenton anvil; mounted at side are Buffalo Forge hand-operated drill press and rotary grinder and wire brush driven by belt from pulley on main drive shaft of gasoline-engine driven welder. Reel on top carries hose for oxyacetylene welding.



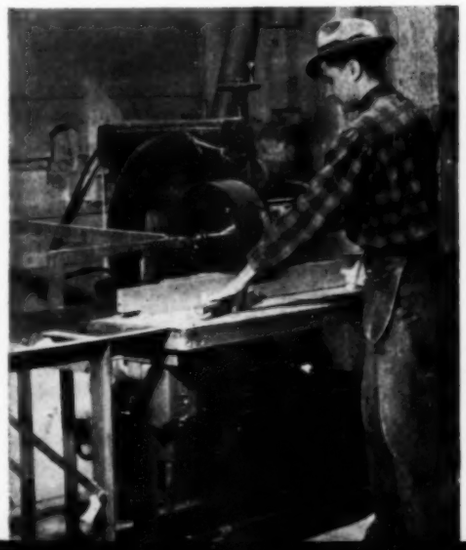
ELECTRIC DRILL USED AS HOIST DRIVE aids steel erection contractor in raising materials on building job. Wodack 1¼-in. portable electric drill is fitted with square socket to operate derrick winch rigged on roof of structure.

PITCH CUT on rafters is made by 7½-hp. DeWalt electric saw, handling eight 2x6-in. pieces in single cutting stroke. Only 6 sec. is required for this cutting stroke.



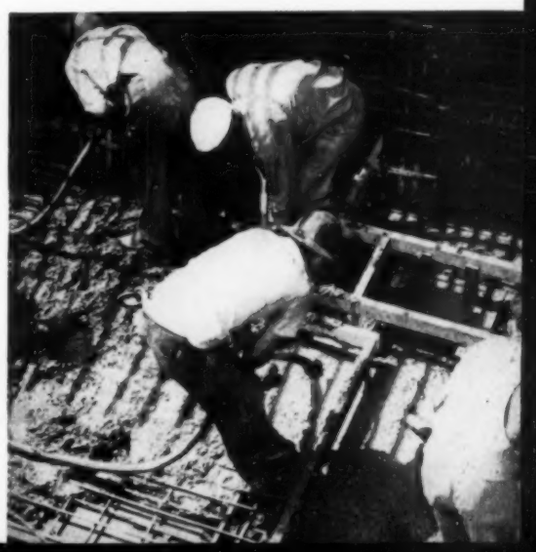
CONCRETE FLOOR FINISH is speeded up by use of Kelley gasoline-operated surfacing machine. Unit is shown at work on concrete floor to which vacuum mats have been applied to remove excess water from concrete.

U. S. Navy Photo



DADO WORK (left) is done by Monarch radial saw on mass production pre-cutting job. Operator has devised eccentric clamp so that two boards can be run in over rolling table to stops and clamped tightly against back fence with slight motion of left hand as dado is drawn against work. Wheel at top of machine raises or lowers dado ⅛ in. every complete turn.

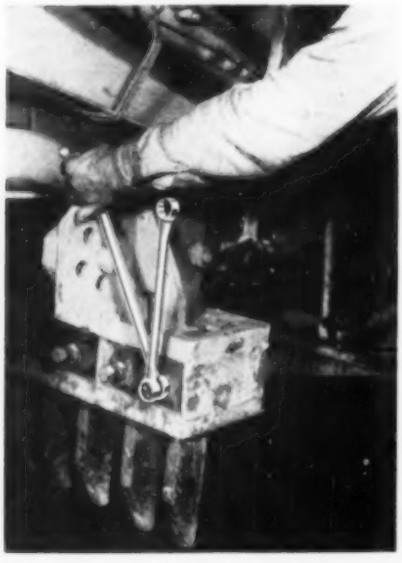
CONCRETE FOR SHIP CONSTRUCTION (right) is consolidated within forms containing closely spaced steel reinforcement by vibrating with Vibor electrically operated flexible unit equipped with 1¼-in.-dia. vibrating element, operated at frequency of 9,500 pulsations per min.



PRECISION GRINDING of metal frame is done with Dumore electrically powered tool.

TILTING TABLE SAW adjusted to 45 deg. rips cant strips from plank for concrete forms on twin bridges built by W. G. Meagher & Sons, Bay City, Mich., for Michigan State Highway Department across Rouge River on Detroit Industrial Expressway. Table of Greenlee saw can be raised and lowered for cutting to various depths and can be tilted to any angle up to and slightly exceeding 45 deg.

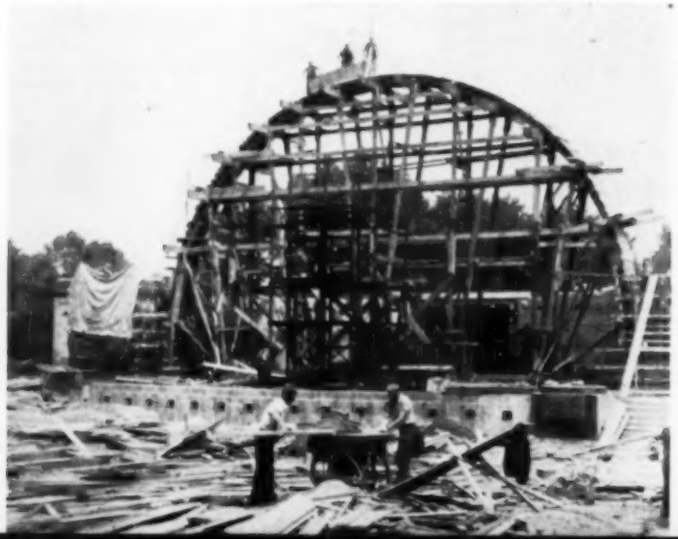
STRAIGHTENING BOWED STEEL CAP used on premolded expansion joint material in concrete pavement, crew of Bridgeport Core Sand Co., Saginaw, Mich., employs oxyacetylene outfit with Harris Calorific No. 6 tip to cut slots in flange and then to weld slots with steel rod. Gas cylinders are carried by job repair truck serving Bridgeport's contract for Michigan State Highway Department on Detroit Industrial Expressway.

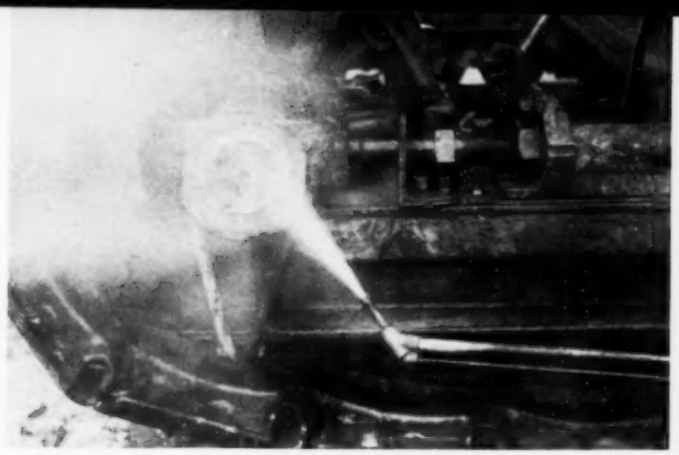


RESETTING OF BLADE ON ROAD SCARIFIER is done in minimum time when Snap-on box wrenches are used to set and lock holding bolts. These wrenches are adaptable to jobs where bolt protrudes far beyond nut and prevents use of socket wrench equipment. Fitting all around nut, it enables operator to exert as powerful leverage as necessary without fear that tool will slip.

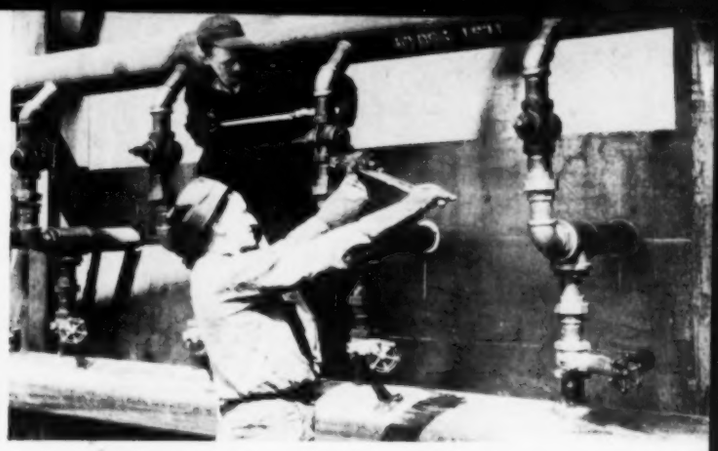
THREADING PIPE ON CONSTRUCTION PROJECT (below) are these two Oster power-driven machines designed for handling 4-in. dia. stock. Machines have capacity of $\frac{1}{2}$-4-in. pipe through spindle and up to 12-in. dia. with drive shaft.

FORM LUMBER for building large band stand in Milwaukee park is cut by C.H.&E. saw rig powered by an 8-hp. Wisconsin air-cooled engine. Machine has capacity of ripping up to 4-in. lumber and is equipped with a 26x38-in. tilting table.



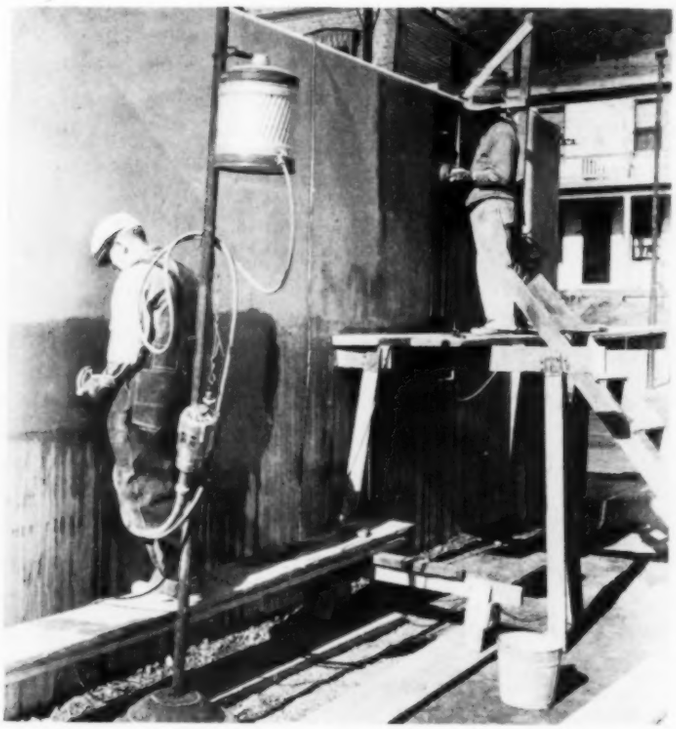


STEAM-DETERGENT METHOD of removing heavy grease, muck and other deposits from tractors and other types of construction equipment is made possible by use of Oakite steam gun. Combination of heat, pressure and detergent solution insures effective cleaning.



JOINTS IN PIPE are tightened with aid of pair of Trimont long-handle wrenches. Outstanding advantage of these wrenches is that they can be counted on to produce ample leverage for performance of their task on any type of pipe joint.

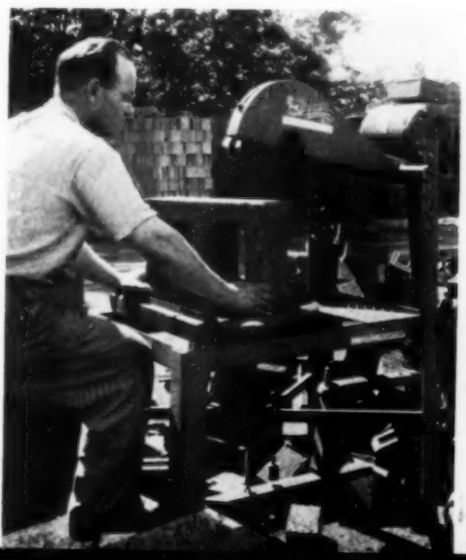
U. S. Navy Photo



TO SERVE NEEDS OF ARMY ENGINES this truck-mounted Le Roi air compressor (above), designed to operate variety of small tools, is standard equipment. Powered by 36-hp. gasoline engine, 105-cu. ft. compressor serves following tools, all standard equipment: rock drill, wood auger, circular saw, band saw, clay digger, nail driver, tire inflator, concrete vibrator, sump pump, backfill tamper, and paint spray gun.

WATER-FEED CONCRETE SURFACERS finish flood wall at Cincinnati pumping station. Wet rubbing is done with Berg ½-hp. low-speed machines operating at 200-300 r.p.m. and equipped with 5½-in. dia., cup-shaped carborundum disks.

NO PRIMING is required with this Chicago Pneumatic sump pump (right). Simply turn on compressed air, lower unit into water and pump starts working. Pump has watertight casing which prevents muck reaching motor.



CUTTING OF CONCRETE BLOCKS on large housing project (left) is done with Clipper masonry saw equipped with abrasive disk. Cuts through the webs of this 12x8x16-in. block are being made in about 10 sec. Operator uses treadle in order to control machine.

SAWING LUMBER for building construction is done with Beach contractor's sawrig (right) powered by 5-hp. Wisconsin gasoline engine. Tilting feature of table makes it possible to cut all types of plain and compound miters accurately and speedily.

Small Tools on Construction

LOW-SLUMP CONCRETE is screeded by Whiteman portable rodding machine handled by one operator. Power-driven screeds ride header boards, making 3½-in. transverse strokes in opposite directions, simultaneously leveling and compacting concrete slab.

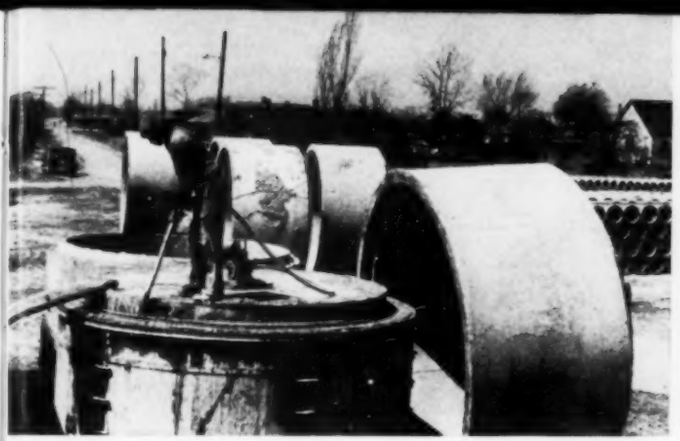
PNEUMATIC CHAIN SAW of Mall manufacture cuts large timbers at West Coast shipyard. Powered by rotary type air motor. Idler assembly includes chain tensioning and oiling device. Chain speed, 1,000 ft. per min. Detachable safety guard is mounted to permit movement through cut without binding or interfering with sawing operation. Models of this saw are available for use in under-water cutting.

BOLTS IN JOINTS between concrete pontoons forming novel 7,721-ft.-long floating bridge across Lake Washington, at Seattle, Wash., are tightened with a 5½-ft. Lowell ratchet wrench. Through four-part line wrench is manipulated by Ingersoll-Rand air hoist, producing a pull of 4,000 lb. The hoist operates on air at 100 lb. per sq. in. pressure. Contractors on project were Pontoon Bridge Builders.

A PAIR OF JACKS (below) of Duff-Norton manufacture are here employed to move a heavy wood beam of glued, laminated construction.

VARIETY OF SMALL TOOLS (below) is operated by Onan 10LS electric plant which is self-starting by remote control.

BACK FILL IN TRENCH is consolidated with aid of Ingersoll-Rand pneumatic tamper (below). This machine weighs 31½ lb.



CONSOLIDATION OF CONCRETE in large precast pipe is accomplished by using Master vibrator with power furnished by portable gasoline engine.

EXTENSION ATTACHMENT on Skilsaw electric drill facilitates work in close quarters between studs and joists for electrical and plumbing installations. This device solves problem of reaching places otherwise difficult of access.

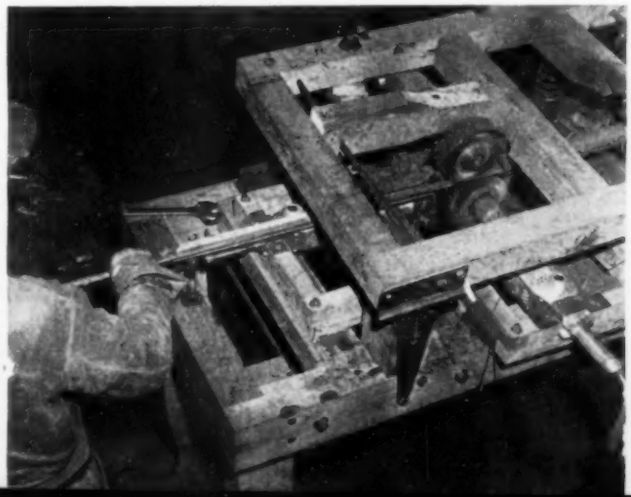
TORQUE-INDICATING WRENCH of Bonney manufacture, equipped with standard ½-in. square drive lug, has ratchet mechanism that is reversible. When desired torque is reached red ratchet lever snaps to center, a sharp "click" is heard and ratchet mechanism locks. Small head permits use in normally inaccessible places.

Army Signal Corps Photo

TOPS OF WOOD PILES are cut off quickly and accurately to proper grade with Reed-Prentice chain saw (right) which is powered by compressed-air motor.

MOUNTED ON MULE BACK (left) for transport in mountainous country this Disston-Mercury gasoline-powered chain saw proves serviceable tool for U. S. Army Engineers. Special saddle holds saw securely and also provides for cases holding hand tools, accessories and spare parts.

FOR CLEANING STEEL REINFORCING RODS Virginia contractor rigs three Black & Decker grinders (below) with wire-wheel brushes in wood frame.



FOR CLEANING HARDENED CONCRETE (below) from mixer Thor portable electric hammer proves useful tool for maintenance of contractor's equipment.

HOW They Did It

CONSTRUCTION DETAILS For Superintendents and Foremen

LUFFING SCREW DEVICE eliminates need for usual boom cable on full-revolving gantry cranes designed and built by Dravo Corp., of Pittsburgh, Pa., for use at two shipbuilding basins of "submerged" type on Eastern seaboard. Two sizes of cranes are fitted with this equipment. Smaller units have 28-ton capacity at radius of 86 ft. and 10-ton capacity at 136 ft.; larger cranes lift 84 tons at 104-ft. radius.

PHYSICIAN'S STETHOSCOPE is used to detect defects in weld. Operator places stethoscope against plate and taps weld with small hammer. Since each welded structure has characteristic tone, any irregularity becomes discernible as instrument is moved along weld. End of stethoscope should be covered with piece of soft rubber to insure good contact on rough surface of plate. It must be held firmly against plate so only sounds from plate will be heard.
Linde Air Products Photo

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TWO CHICAGO BOOMS, designed to handle 50-ton loads at full radius of 110 ft., rigged so that they can move each other, are used to dismantle 425-ft. steel towers of Tacoma Narrows cable suspension bridge (left), which failed Nov. 7, 1940, after 42-mi. wind had caused violent waving and twisting of slender structure, which had central span of 2,800 ft. Steel of towers was removed, after "busting" of rivets, in sections weighing up to 30 tons.

INCLINED CRADLE (below) supported between two lighters lays 12-in.-dia. cast-iron pipe to depths up to 40 ft. for submarine crossing of Ashley River by water line at Charleston, S. C. Pipe sections 16 ft. long are connected by Molox bolted ball-and-socket joints which permit 15-deg. deflection. Lighters move forward across 1,900-ft. tidewater river as hand winch pulls in anchor cables, allowing successive pipe joints to slide down 35-ft.-long inclined ladder chute, or cradle, to river bottom. Best day's progress is 18 pipe sections. Charleston Constructors, general contractors; James E. Gibson, manager and engineer, Charleston Water Department.

HAND LEVELING WHEEL within reach of operator on Buffalo-Springfield trench roller controls vertical screw which raises or lowers small right-hand wheel to level machine, as indicated by spirit bubble on transverse member, thus keeping 20-in. roller wheel level for compacting subgrade on Ohio highway widening job of Scully Bros., contractors, Cincinnati.

DEMOLISHING OLD PAVEMENT (left), such as concrete, brick and asphalt roads and bridge flooring, is job of Novo pavement breaker. Special 2,500-lb. drop hammer is equipped with 450-lb. breaking nose, which can break to any specified size, shockproof nose for breaking pavement over water and gas mains and sewer pipe without damaging utilities, and knife for cutting trenches in pavements, and trimming edges.

WATER FOR WAR INDUSTRIES (right) in Detroit area is made available by new Down River supply system involving pipe line of 54-in.-dia. concrete pipe sections precast in large metal forms. Federal Works Agency project estimated at $807,800 was done by force account by Board of Wayne County Commissioners. Concrete bucket discharge is controlled by long, pivoted arm.

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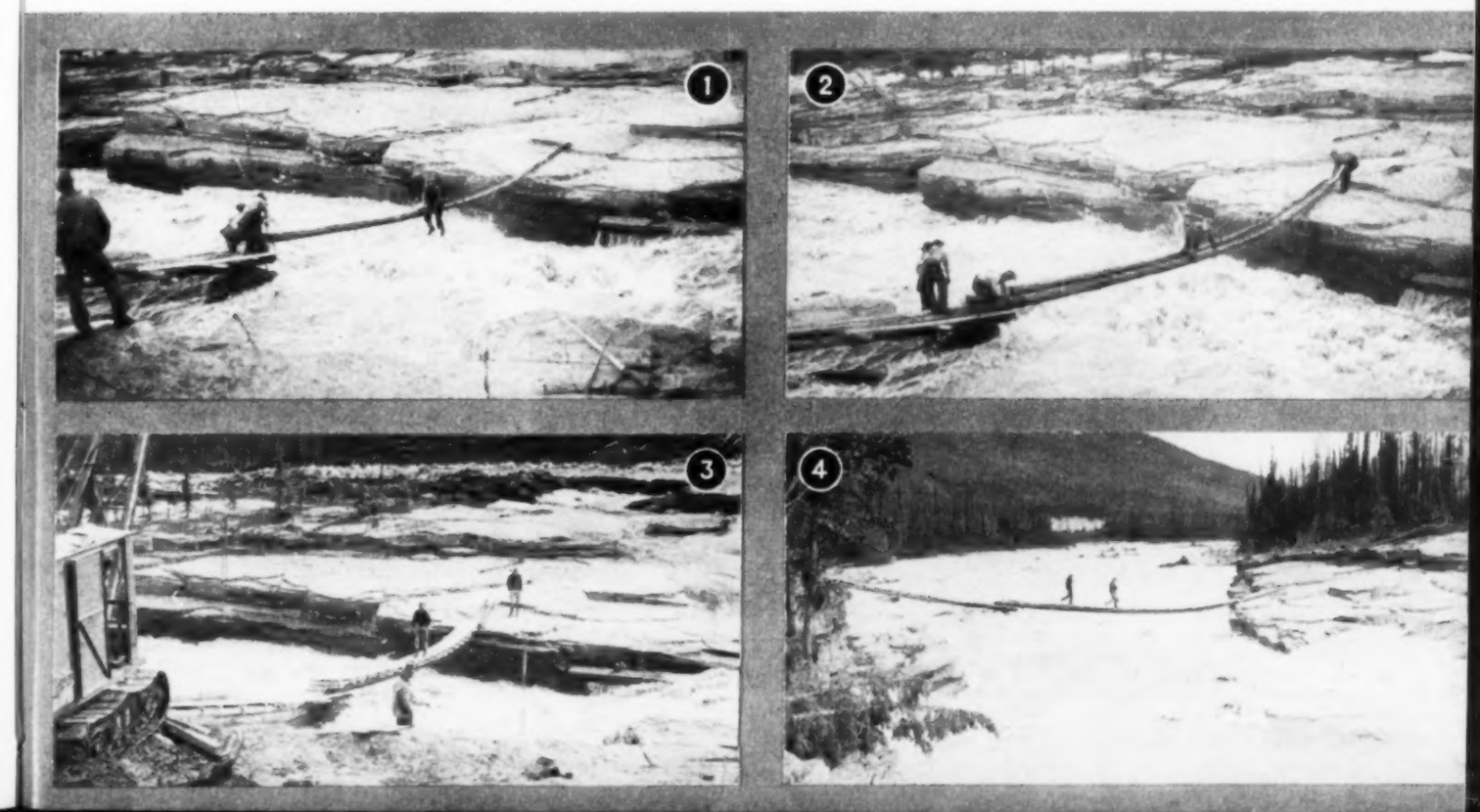
TEMPORARY POLE FOOT-BRIDGE (below) is built to provide crossing of Racing River adjacent to site of timber trestle bridge under construction along route of Alaska Military Highway. Four numbered photographs illustrate successive stages in spanning stream with simple structure using timber felled at site and placed with aid of crawler crane. Plank floor is nailed to pair of timbers spanning stream.

Armco Photos



POINTED ENDS on 4x4-in. posts for refuse wickets are cut by Walker-Turner 12-in. 2-hp. electric saw of radial, adjustable type in job shop of The Trimble Co., Pittsburgh, contractor for FPHA war housing project being built under direction of Allegheny County, Pa., Housing Authority.

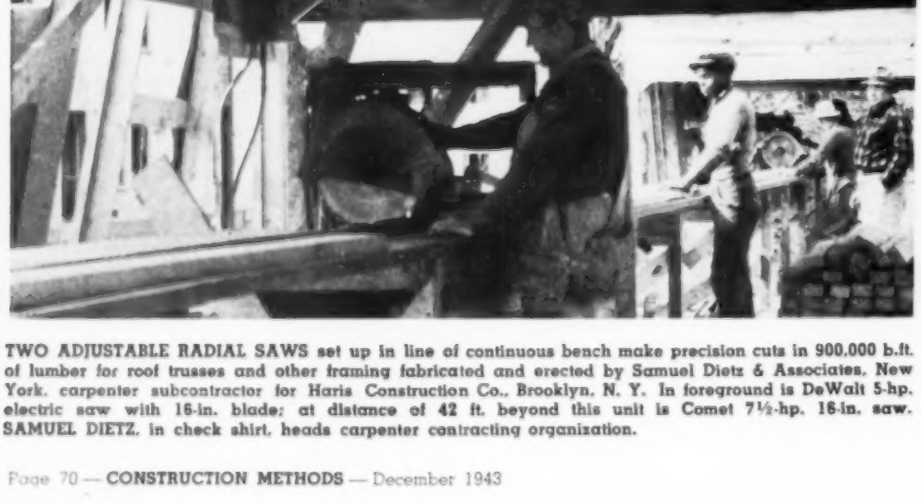
SETTING TEETH of hand saws on FPHA war housing contract of The Trimble Co., Pittsburgh, carpenter uses Stanley pistol-grip saw set made with flange which holds device in true alignment on saw blade. Spring releases saw set when pressure is relaxed. Prior to setting, teeth are jointed as necessary with flat file.

AFTER SETTING SAW TEETH, workman sharpens them with Nucut slim-taper wavy-teeth saw file good for sharpening about 15 saws before it has to be discarded.

Small Tools

ON WAR HOUSING JOBS

IN THE CONSTRUCTION OF two war housing projects for the Federal Public Housing Authority in the valley of Little Sewickley Creek near Ambridge, Pa., under the supervision of the Allegheny County Housing Authority, the general contractors and their subcontractors have made effective use of small power tools and hand tools to speed operations. The Haris Construction Co., Brooklyn, N. Y., is contractor for a $900,000 project, called Drydock Dwellings, in Sewickley Township, and The Trimble Co., Pittsburgh, holds the contract for a $500,000



TWO ADJUSTABLE RADIAL SAWS set up in line of continuous bench make precision cuts in 900,000 b.ft. of lumber for roof trusses and other framing fabricated and erected by Samuel Dietz & Associates, New York, carpenter subcontractor for Haris Construction Co., Brooklyn, N. Y. In foreground is DeWalt 5-hp. electric saw with 16-in. blade; at distance of 42 ft. beyond this unit is Comet 7½-hp. 16-in. saw. SAMUEL DIETZ, in check shirt, heads carpenter contracting organization.

CINDER CONCRETE BLOCKS are cut with abrasive disk by Clipper 1-hp. electric masonry saw on Trimble contract. Blocks can be broken to clean edge after they have been scored on both sides by cuts with abrasive disk.

CHEEK CUT is made to accurate miter and bevel in 2x6-in. jack rafter by Comet 7½-hp. electric radial saw with 16-in. blade in job shop of Samuel Dietz & Associates, subcontractor for Haris Construction Co. on FPHA war housing project supervised by Allegheny County, Pa. Housing Authority.

TO CUT AND THREAD 1½-in. pipe on FPHA war housing contract of Haris Construction Co., pipefitter uses Oster Pipe Master 1½-hp. electric cutting and threading machine in job shop of Tully Plumbing & Heating Co., New York subcontractor. Machine also takes 1¼-in. and 2-in. sizes.

job in Leet Township, ¾ mi. nearer the Ohio River. Both projects call for two-story apartment buildings about 170 ft. long by 21 ft. 7½ in. wide containing up to 16 living units providing one, two or three bedrooms each, in addition to a combination kitchen-living room. The larger project provides 380 living units in 35 apartment buildings, and the smaller project, 200 living units in 15 buildings. Additional buildings are included for community use.

Economy and availability were the principal factors governing choice of materials for the war housing project, designed for a useful life of five years. Exterior walls consist of 8-in. cinder-concrete or slag-concrete blocks. On the inside, these walls are furred with 1-in. wood strips and finished with two-coat plaster. The exterior face is given two coats of white cement paint. Gable roofs of the dwelling houses are framed with trusses of 2x4-in. lumber fabricated on the job into units of surprising rigidity. The trusses are set on 24-in. centers. To save lumber, roofs are sheathed with ½-in. gypsum plank on 1x4-in. wood strips nailed to the trusses on 12-in. centers. Single roll roofing, with joints cemented and tacked, covers the gypsum plank sheathing. Upper floors are oak on wood joists, and first floors either duplicate this wood construction or consist of 4-in. plain concrete placed over reinforced moisture-resistant paper on 6-in. fill of gravel or cinders.

Lumber was precut to exact length in job shops and was fabricated into nailed framing units on template tables. For the larger project, Samuel Dietz & Associates, carpenter subcontractor, New York, prefabricated 900,000 b.ft. of lumber in frame units and erected all the wood required for the job without any sawing by hand. This contractor placed all lumber, including roof cornices, without use of scaffolds; but the Trimble Co. on the other project employed scaffolds supported by wooden jacks at the windows.

BEFORE APPLYING each of two coats of white cement paint to masonry block wall, painter wets surface with water from Hudson portable hand-pump spray outfit. Walls are built of 8-in. cinder-concrete or slag-concrete block on FPHA war housing contract of Haris Construction Co.; Harry Freedman, Passaic, N. J., is subcontractor for painting.

HAMMERS ARE ONLY TOOLS NEEDED by carpenters nailing accurately precut lumber into roof trusses on three template tables of Samuel Dietz & Associates. Carpenters are here assembling jack trusses, but templates are used also for full-span roof trusses.

GRADING-LOADING UNIT equipped with 54-in. belt driven by 150-hp. diesel engine spills heaping load of sandy clay or clay into 16-yd. bottom-dump wagon in 40 to 60 sec. depending upon type of material. Loader is drawn by 17-ton, 113-hp. tractor and is controlled by three levers behind driver's seat.

New Grading-Loading Machine

Fills 16-Yd. Wagons in 40 to 60 Sec.

INCORPORATING FEATURES which differ radically from those of the conventional elevating grader, a new type of tractor-drawn grading-loading machine equipped with a moldboard-type plow and a 54-in. power belt mounted diagonally in the frame consistently charged 16-yd. heaped loads of sand-clay and clay into pneumatic-tired hauling units in 40 to 60 sec. per load, while working in conjunction with four elevating graders of conventional construction on 2,700,000 cu. yd. of grading involved in a $2,000,000 contract recently completed by the MacDougald Construction Co., Atlanta, Ga., for the U. S. Engineers at a Southern airfield. Output of the loader was dependent on the type of material being moved and on the number of wagons available for loading. During the entire period of grading on the project, the machine loaded about 40 16-yd. wagons per operating hour and averaged 550 cu.yd. of material, bank measurement, per hr.

Certain design advantages of the new machine made it more successful for the grading work, in the judgment of the contractor, than conventional disk-plow elevating graders, five of which were kept on the job, four in active use and a fifth at all times in reserve. The new loader is a strongly built unit mounted on a pair of crawler track wheels and attached by a universal hitch to a tractor of at least 16-ton size required for best performance. A wide moldboard cutting blade, with a plow point at the left side of the machine, and a 54-in. belt driven by a 150-hp. diesel engine give the unit a capacity for rapid loading of any material which can be cut by the plow. Operation of the loader is completely under the control of the tractor operator by means of three hand levers mounted behind the tractor seat. Through flexible push-pull cables, these levers operate hydraulic rams which control the starting and stopping of the conveyor belt, the raising and lowering of the left-hand crawler track wheel to level the loader, and the raising and lowering of the cutting blade. Accompanying photographs show the operation of the loader on the airport job.

FRONT-END YOKE of loader is fastened to crawler tractor by universal hitch. Mounted on yoke is hydraulic ram for raising and lowering cutting blade, controlled by flexible push-pull cable from one of three levers behind driver's seat on tractor.

Airport Grading

Characteristics of the airport site made it a logical elevating grader job. Grading required the moving of 2,700,000 cu. yd. of sandy clay and clay (classified as A-3 to A-5 material) for a flight strip about 12,000 ft. long by 1,200 ft. wide, in the center of which is located a concrete-paved runway measuring 10,000x500 ft. A-3 soil was stockpiled at the beginning of the job and was rehandled later into place as a sub-base for the pavement. The longitudinal profile of the project

called for a cut about 4,000 ft. long and 8,000 ft. of fill, necessitating an average haul of 8,500 ft. The cut ran to a maximum of 22 ft., and the fill to a maximum of 18 ft.

To transport material on the long hauls involved in this job, the contractor operated fast-traveling pneumatic-tired equipment comprising 35 Euclid 13-yd. (water-level) bottom-dump hauling units, three Caterpillar 10-yd. wagons, and six Tournatrailers. This fleet of hauling units was served by four 48-in. power-belt elevating graders and the new grading-loading machine with the 54-in. belt. In all, the five loading units took care of about 2,500,000 cu.yd. of grading; the remainder was moved by six tractor-scraper outfits.

DIAGONAL MOUNTING of conveyor belt in frame of loader permits hauling unit to travel close to loader, thus enabling combination to work in narrow cuts. Note level grade left by cutting blade of loader.

New Loader

Designed and built by the Euclid Road Machinery Co. as the pioneer model of a new line of loaders, the grading-loading machine has a cutting blade with an overall width of 9 ft. 6½ in. Cuts can be made to this width and to depths as great as 24 in., but a good average cut, according to the manufacturer, is 4 ft. wide by 18 in. deep. On the airport job, the cuts generally were smaller, about 16 to 18 in. deep and 3 ft. wide, requiring less than 100 ft. of travel for a 16-yd. heaped load. On part of the excavation where material was hard, the contractor used a rooter to facilitate loading with the moldboard type of plow on the Euclid loader, which operated more efficiently in this material than the disk-type plows of the other elevating graders. Hard material was rooted to a depth of 15 in., and the loader removed a cut about 16 in. deep by 36 in. wide.

In operation, the plow point at the left end of the moldboard cuts into the bank, and dirt boils up the charging throat near the center of the blade, where the material slides on to the belt. Diagonal mounting of the belt reduces the overhang of the discharge chute and makes it possible for the loader and a hauling unit 9½ ft. wide to operate in a cut of 32-ft. width. The frame of the loader is 10 ft. 4 in. wide, and the overall width, including overhang of the conveyor, is 17½ ft. Length of the conveyor, center to center of the head and tail pulleys, is 32 ft., and vertical clearance under the discharge chute is 10 ft. 3 in. Driven by a Cummins six-cylinder diesel engine which develops 150 hp., the 54-in. belt has a maximum loading capacity of 1 ton per sec. Belt thickness is about ⅝ in. After being used on two jobs, including the airport project, to load at least 1,500,000 cu. yd. of material, the machine is still operating with the original belt. When being made ready for shipping, the conveyor can be shifted horizontally to a position within the limits of the loader frame.

Cart-type mounting of the loader on two crawler track wheels, placed just back of the center, provides easy steering when the unit is being backed. The forward end of the loader is supported by the crawler tractor, to which the front yoke is attached by a universal hitch. Length of the loader frame is 38½ ft., and the overall length from the back of the tractor to the rear end of the discharge chute is 46 ft. On the airport job, a Caterpillar D8 tractor provided the necessary tractive power for efficient operation. In extremely fine sand or other unfavorable ground conditions, a pusher tractor can be used against the rear bumper of the loader frame.

Direction—Operations at the airport site were directed for the MacDougald Construction Co., Atlanta, Ga., by Frank D. Nichols, project manager, who supplied much of the information for these notes. G. H. Ehringer is project engineer for the U. S. Engineers, Charleston District, South Atlantic Division.

BOWL-SHAPED CUTTING BLADE fitted with plow point at near side makes cut of any desired width up to 9½ ft. and crowds excavated material into charging throat near center, where earth slides on to belt. Hard material on airport grading job is rooted in advance to 15-in. depth to facilitate loading; machine makes cut in this material about 16 in. deep and 3 ft. wide.

POWER THAT "DELIVERS"

at Home and on the *Fighting*

As the echo of rumbling tractors fades out in one section of the world it is picked up by another. At nearly every place on the face of the earth, these "battlewagons" and other construction machines are busy helping to change the tide of war — at the fronts, behind the fronts . . . here at home and abroad.

Construction men who are smashing all records building this Arsenal of Democracy know well the job that fast-moving, powerful, Allis-Chalmers 2-Cycle Diesel tractors and companion equipment are capable of accomplishing. Equally impressive is their record-breaking performance on the fight-

ARMY E NAVY

ALLIS-CH

TRACTOR DIVISION

Fronts! . . .

ing fronts. In the thick of it everywhere, they help to speed up the offense — clearing jungles and building roads, constructing bridge approaches, airports and new bases, hauling big guns, pushing or pulling tanks and trucks through mud, mire and water . . . helping to keep the fighting men and their mechanized units rolling ahead.

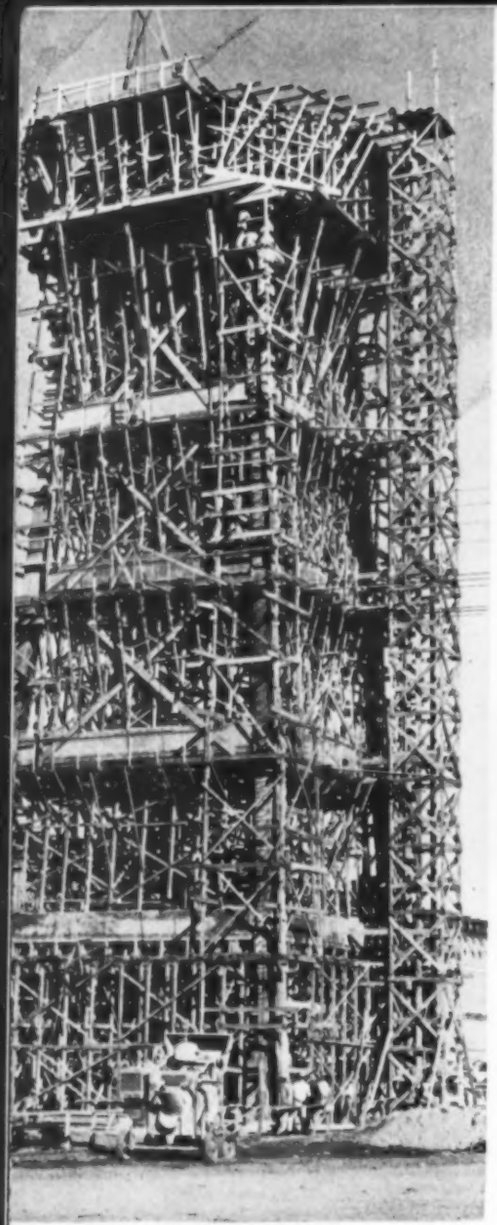
Every unit we turn out for Uncle Sam and our Allies hastens the end of the struggle. You who have immediate need for construction equipment, and at present can't obtain all you want, can take real satisfaction in the thought that the machines you might have had are being put to such good use.

CHALMERS

MILWAUKEE, U. S. A.

Concrete Tower

With Rigid-Frame Struts Carries 100,000 Gal. Wood Tank



FORM WORK AND STAGING nears completion on tower to provide water pressure for recently completed Douglas Aircraft Co. plant.

Page 76

STAIRWAY INSIDE FRAMING of reinforced concrete water tower gives workmen access to upper levels during construction.

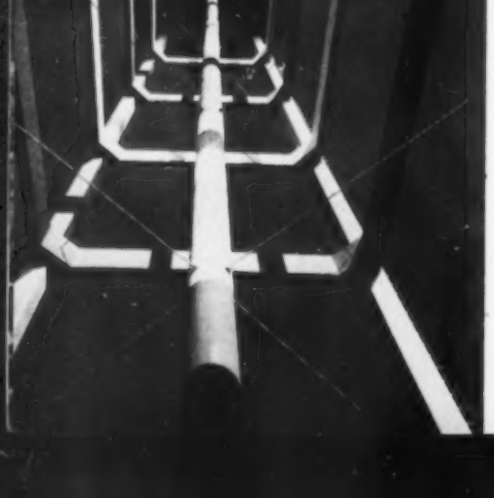
MADE ENTIRELY OF WOOD and supported by a rigid-frame, reinforced concrete tower more than 100 ft. high, a 100,000-gal. water tank was built at a recently completed Douglas Aircraft Co. plant for the manufacture and assembly of large transport planes. The Austin Co. of Cleveland, Ohio, and the U. S. Army Engineers collaborated in its design and construction.

Standing 115 ft. 6 in. above ground surface, the tower supports a redwood tank 30 ft. 6 in. in diameter, which extends upward another 21 ft. 3 in. and is surmounted by airplane beacon light and lightning arresters. The footings extend 10 ft. below the surface of the ground, making the overall height approximately 150 ft. from the bottom of the foundations to the top of the tower. To give the tower increased lateral stiffness and greater stability against overturning, as well as a good architectural motif, the columns batter from 35 ft. c. to c. at the base to 21 ft. 3 in. c. to c. at the top.

In general the concrete columns are 24 in. square and the struts 30 in. deep, except at platform level where the struts are 4 ft. deep and arranged to support a grillage of concrete dunnage beams. Both the columns and struts are well reinforced in both faces, as required for the moments and direct loads.

The tank consists of a 3-in. reduced plank floor laid directly on the concrete supporting structure with 3-in. vertical redwood stave sidewalls held in place with $\frac{3}{4}$-in. round circumferential steel hoops spaced at variable intervals. The roof of the tank is supported from the sidewalls and by means of auxiliary wooden columns within the tank resting on the floor. A single 24-in.-dia. steel pipe riser extends from the ground to the tank on the center line of the tower. This pipe is supported horizontally at 19-ft. intervals by means of diagonal rods equipped with turnbuckles for adjustment. These rods form horizontal lateral systems in each story of the tower which serve to keep the tower squared up under diagonal and quartering wind loads.

WELDED STANDPIPE (below), 24 in. in diameter, serves 100,000-gal. redwood water tank at top of 115-ft. reinforced concrete tower at Army aircraft plant. Diagonal rods equipped with turnbuckles for adjustment support pipe horizontally at 19-ft. intervals.



RAILROAD CAR (below), is unloaded at batch plant at aircraft assembly plant. Conveyor belt which handles materials is in foreground.

Present and Accounted For···A PAGE OF PERSONALITIES

HORSE WISE might be proper sobriquet for LOUIS TUFANO (left), of Tufano Contracting Corp., Jamaica, N. Y., who holds line of his Market Wise after winning Pimlico Special October 31. Among other races won by Market Wise this season was $50,000 Massachusetts Handicap at Suffolk Downs July 5.

Acme photo

WAR HOUSING JOB of FPHA near Ambridge, Pa., is built under supervision of FRANK J. D'ASCENZO (left), superintendent for Allegheny County Housing Authority, and FRANKLIN O. ROBISON, superintendent for The Trimble Co., Pittsburgh.

ELECTED PRESIDENT of American Institute of Steel Construction by directors following recent annual convention, CLYDE G. CONLEY, of The Mount Vernon Bridge Co., Mt. Vernon, Ohio, will head Institute's activities until 1944 fall meeting.

FIRST WOMAN OFFICER accepted in Civil Engineer Corps of Navy Department during 76 years of Corps' existence is Ensign KATHLEEN F. LUX, of Logansport, Ind., civil engineering graduate of Purdue University, 1942.

U. S. Navy official photo

NEW COMMANDING GENERAL of Ninth Service Command, with headquarters at Ft. Douglas, Utah, is Maj. Gen. DAVID McCOACH, Jr., graduate of U. S. Military Academy and an officer in Corps of Engineers for more than 30 years.

U. S. Army Signal Corps photo

ANNUAL BUSINESS MEETING (below) and dinner of The Moles, New York organization of tunnel and heavy construction men, brings together at table: (left to right) JOHN S. (Jack) MACDONALD, president; ARTHUR A. JOHNSON, vice president; and CHARLES B. SPENCER, chairman of Moles Award Committee. These men are respectively, vice president and general manager, Walsh-Kaiser Co., Providence, R. I.; president, Arthur A. Johnson Corp., Long Island City, N. Y.; and vice president, Spencer, White & Prentis, Inc., New York.

SUPERVISING CONSTRUCTION (below) of war housing for Allegheny County, Pa., Housing Authority, agent of FPHA, are WILLIAM E. DUCKWORTH (right), superintendent on Sewickley Township project, and STEPHEN A. SZYGENDA, inspector formerly on this project, transferred later to Leet Township project.

You get "Pressed Fit" only with genuine Laughlin "Missing Links"

The drop-forged, heat-treated "Missing Link" is press-fitted together under pressure, matching the parts so there is no play, no shearing action on the rivet. Under stress the rivet merely holds the "Missing Link" together, and does not take the load.

THE "MISSING LINK"

Drop-forged steel, heat-treated. Sizes from $\frac{3}{16}$" — $1\frac{7}{8}$"

THE PEAR SHAPE "MISSING LINK"

The link with larger inside dimensions. Each link drop-forged and heat-treated.

Save time, increase safety by specifying
The Genuine "Missing Link"

Write for latest catalog on Laughlin Industrial Hardware.

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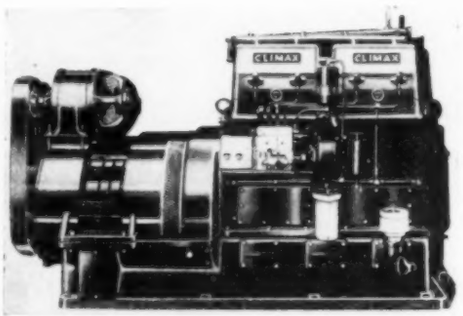
THE THOMAS LAUGHLIN Company
PORTLAND, MAINE

CONSTRUCTION EQUIPMENT NEWS

DECEMBER 1943, REVIEW of Construction Machinery and Materials

DIESEL ENGINES are announced for use as light plants and primary drives for pumps, compressors, mills, mine equipment, and marine service. Model D148 is two-cylinder unit with maximum rating of 22 hp. May be equipped for pulley drive with or without clutch or clutch and reduction gear or auxiliary power takeoff. As diesel-electric plant, it may be direct connected on single base with 15 kva generator. Model D297 is four-cylinder unit with maximum rating of 44 hp. Drive equipment may be furnished. Flywheel, clutch, generator or marine gears may be installed on either or both ends, if radiator is not used. For electric power and light, it may be used to power 30 kva generator.—**Climax Engineering Co., Clinton, Iowa.**



★ ★ ★

RUST INHIBITOR, known as Eveready Formula RG-2M, is designed to safeguard motor cooling systems against rust and corrosion. Defoams used ethylene glycol solution which reduces overflow losses from foaming to minimum and conserves anti-freeze, as well as protecting cooling system.—**National Carbon Co., Inc., 30 E. 42nd St., New York, N. Y.**

★ ★ ★

GYPSUM BUILDING PRODUCTS will hereafter be sold under new trade mark of "Celo-Rock". Among products to be distributed under this name are anchor plaster, lath, liner board, sheathing, backer board, white rock wallboard, exterior wall units, interior wall units, roof deck slabs, and gypsum accessories.—**Celotex Corp., Chicago, Ill.**

★ ★ ★

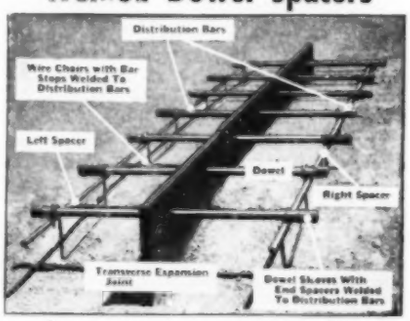
DECLIVITY LEVEL is designed for shipbuilders and shipfitters. Can be easily adjusted to proper angle of declivity or pitch. When red fluid glasses on level are set to desired angle, mechanic no longer has to use declivity boards. Red glasses can be set individually to any pitch or declivity up to and including 2 in. to foot. Black dots and arrows on both sides of level indicate end or edge to use for declivity readings. Glasses may also be set in pairs to any degree in circle. Level is of cherry stock, air-seasoned, kiln-dried, and sealed against moisture. Model 23-S is 24 in. long and weighs 2 lb.—**Stanley Tools, New Britain, Conn.**

Build Better Runways

for the Birds of War!

Insure Substantial, Long-Lasting Concrete Runways and Aprons with

LACLEDE
Welded Dowel Spacers


Distribution Bars
Wire Chairs with Bar Stops Welded To Distribution Bars
Left Spacer
Dowel
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Transverse Expansion Joint
Dowel Sleeves With End Spacers Welded To Distribution Bars

Time-Saving Accurate — Rigid Available Now!

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LACLEDE STEEL COMPANY
SAINT LOUIS, MISSOURI

➡ EASY STARTING

Tips FOR SUCCESSFUL COLD WEATHER OPERATION

- ✓ **Always** hold clutch pedal down while starting engine.
- ✓ Use good grade of winter gasoline for starting and allow adequate time for motor warm up.
- ✓ Keep spark plugs cleaned and properly spaced.
- ✓ Use correct grades of winter lubricants—not only in engine but in power control box and other gear cases.
- ✓ Use only approved anti-freeze solutions.
- ✓ When filling radiator in freezing weather cover entire radiator, start engine and then put in water **immediately.**
- ✓ Fill fuel oil and gasoline tanks at end of each day's run to prevent moisture from collecting in tanks.

REMEMBER—An Engine In Good Condition is an Easy-Starting Engine

JUST AS A QUICK PUSH with his ski-poles gets a ski trooper easily into motion, so does the pressing of the starter button cause the engine of an Adams Motor Grader to roar into action in any climate or weather! An Adams Diesel combines the *easy starting* of gasoline with the economy and efficiency of full Diesel operation in a single engine... This feature saves time, trouble and tempers in cold weather operation while its simplicity and easy maintenance make it equally valuable in other seasons . . . After Victory *easy starting* is but one of many Adams features you will appreciate in carrying on your peace-time jobs!

J. D. ADAMS COMPANY, INDIANAPOLIS, INDIANA

Adams motor graders, leaning wheel graders, elevating graders, hauling scrapers, tamping rollers, bulldozers and road maintainers are used by allied forces throughout the world.

Adams

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

Austin-Western Built

yesterday

All-Wheel-Drive and All-Wheel-Steer made the "99-M" Power Grader a standout on all types of road construction and maintenance.

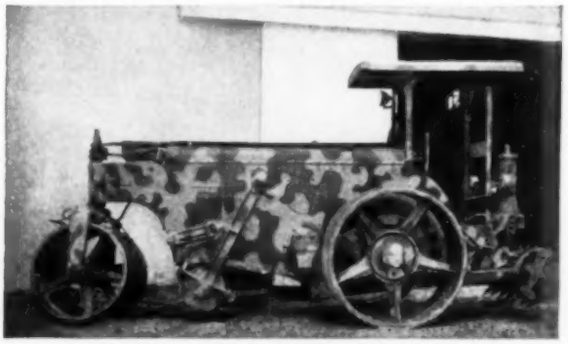
Autocrat and Cadet Rollers . . descendants of America's first Motor Roller . . . were a familiar sight on the highways of this country.

Hundreds of Patrol Sweepers helped make cities and villages cleaner and better places in which to live.

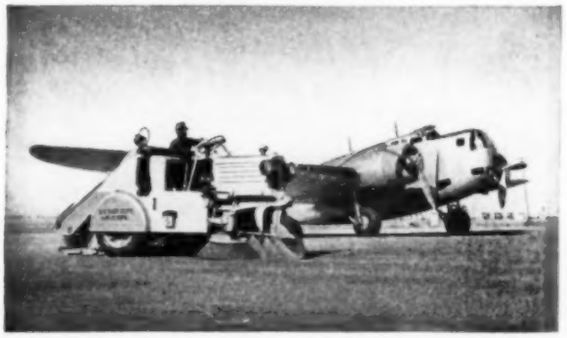
The tremendous output of this Twin Unit Crushing Plant was speeding a job of highway construction.

today

A "Seabee" gets the feel of the mate to the machine he may well operate in some far flung island of the South Pacific.



This camouflaged Cadet Roller is "holding the fort" with conspicuous success at a Caribbean base.

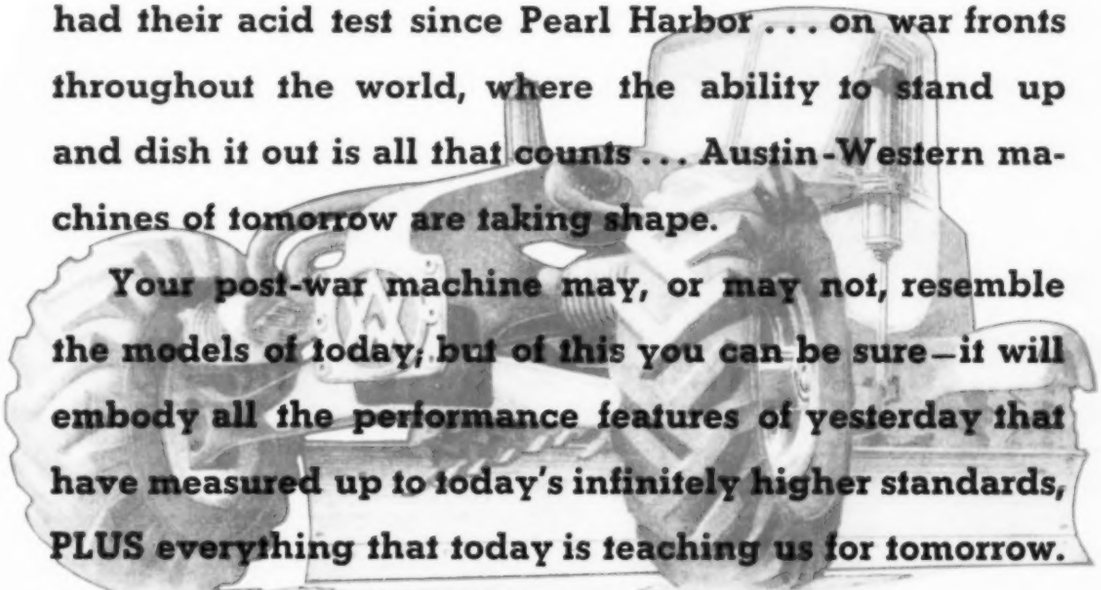


Other hundreds have gone to war. keeping runways and aprons clean and safe.

A brother Plant gets out crushed gravel for a rush job at a Nav Ammunition Dump.

to Outperform!

Tomorrow



Tried and proven on the home front where features designed to insure long life and trouble-free service have had their acid test since Pearl Harbor . . . on war fronts throughout the world, where the ability to stand up and dish it out is all that counts . . . Austin-Western machines of tomorrow are taking shape.

Your post-war machine may, or may not, resemble the models of today; but of this you can be sure—it will embody all the performance features of yesterday that have measured up to today's infinitely higher standards, PLUS everything that today is teaching us for tomorrow. More than ever, it will be "Built to Outperform."

THE AUSTIN-WESTERN ROAD MACHINERY CO., AURORA, ILLINOIS, U. S. A.

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The Austin-Western line includes POWER GRADERS, ROAD GRADERS, ELEVATING GRADERS, ROAD ROLLERS, SHOVELS AND CRANES, STREET SWEEPERS, DUMP CARS, TRAIL CARS AND A COMPLETE LINE OF ROCK CRUSHING AND SCREENING PLANTS

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PARA Tarpaulins have strictly a paraffin base which contains no oil or clay. They have been air dried—not exposed to excessive heat. The result is that PARA Tarpaulins are dependably waterproof, have extra strength and long life, are not subject to spontaneous combustion. For paramount quality always specify "PARA"—America's most popular tarpaulin.

WHEN you need tarpaulins—and need 'em *fast*—'phone the nearest Wenzel Distributor. His stocks of the nationally famous PARA Tarpaulins are complete—all popular sizes and weights. You can depend upon superior service, immediate shipment, and a product that users agree is "Tops in Tarps." No priorities necessary.

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11—INDIANA
Standard Equipment & Supply Co. Hammond
Van Camp Hardware & Iron Co., Indianapolis

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Harry Alter & Sons, Davenport
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Eddy & Cuthbert, Lansing
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A. M. Holter Hardware Co., Helena
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Anderson Equipment Co., Omaha

22—NEW JERSEY
Dale & Rankin, Inc., Newark

23—NEW MEXICO
Charles Ilfeld Co., Albuquerque

24—NEW YORK
Keystone Builders Supply Co., Rochester
New & Used Equipment Co., Long Island
Rupp Equipment Co., Buffalo
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Trevor Corp., Buffalo
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25—NORTH CAROLINA
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Moriarty Machinery Co., Toledo
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27—OKLAHOMA
Leland Equipment Co., Tulsa
Mideke Supply Co., Oklahoma City
The Victor L. Phillips Co., Oklahoma City

28—OREGON
May Hardware Co., Portland
Woodbury & Co., Portland

29—PENNSYLVANIA
Austin Supply Co., Philadelphia
Dravo-Doyle Co., Pittsburgh

30—SOUTH CAROLINA
C. D. Franke & Co., Inc., Charleston

31—SOUTH DAKOTA
The Dakota Iron Store, Sioux Falls

32—TENNESSEE
Keith-Simmons Co., Inc., Nashville
C. M. McClung & Co., Inc., Knoxville
Orgill Brothers & Co., Memphis
Stratton-Warren Hardware Co., Memphis

33—TEXAS
Amarillo Hardware Co., Amarillo
Peden Iron & Steel Co., Houston
W. H. Richardson Hardware Co., Austin
Sabine Supply Co., Orange
The Walter Tips Co., Austin
Zork Hardware Co., El Paso

34—UTAH
Geo. A. Lowe Co., Ogden
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14

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YOUR GUARANTEE
GENUINE
PARA
PURE PARAFFIN
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WATERPROOF TREATMENT

ABRASIVE BLADES in 27 varieties are available for use with Clipper masonry saws to provide economical cutting results on any masonry material, regardless of hardness. Easily cut glazed tile, concrete products, transite, and virtually every

refactory, including clay, chrome, magnesite, silica, sillimanite, zircon, fosterite, high alumina, and magnesia. Day press clay fire brick can be cut in two in less than 3 sec., insulating brick in 1 sec., and acid-proof stoneware type in 21 sec.—**Clipper Mfg. Co., 509 E. 16th St., Kansas City, Mo.**

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PREFABRICATED SHOWER STALL provides bathing facilities in housing, factories, army camps, hospitals and other institutions, dormitories, hotels, trailers, and boats and ships. Has steel frame and crown, finished in baked-on enamel. Walls are of natural finish cement asbestos board. Steel-reinforced concrete receptor provides rigid waterproof base. All joints are tightly held by self-tapping screws or bolts. Has quality of solid one-piece structure when erected.—**Barclay Mfg. Co., 385 Gerard Ave., Bronx, N. Y.**

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GEAR TESTER detects and locates faults during manufacture of precision gears and checks accuracy when completed. Employs highly sensitive, accurate and rugged Comparitol head mechanism. Is of vertical construction and occupies little bench space. Center distance may be quickly checked by setting up instrument to proper distance with gage blocks or standards. Master gear, or gear known to be accurate, is placed on arbor and gear to be tested is placed on another arbor in direct contact with master. Master gear bracket is provided with counterbalance which can be adjusted so that pressure between master gear and gear to be tested is always uniform. Comparator head reads to .001 in., .0005 in., .0025 in., or .0001 in., as desired. Has range of 1- to 6-in. center distance, with special attachments available to enable inspector to check down to smallest center distance in highly precise gears.—**George Scherr Co., Inc., 128 Lafayette St., New York (13), N. Y.**

Found—a New Source of Rubber Right in Your Own Garage

This is a valve cap.

Engineers who devoted years to the study of tire maintenance designed this important little gadget to keep dirt *out* of tires and air pressure *in*.

Yet in a comprehensive analysis of over 300 fleets made by B. F. Goodrich engineers recently, only one fleet had valve caps on all tires!

It is safe to say that if this one rule of tire health were observed by every truck operator in the country and proper inflation maintained, enough rubber would be saved to ease the tire shortage.

Recognizing that improper tire care wastes thousands of tons of rubber every month, The B. F. Goodrich Company organized a Tire Conservation Department long before Pearl Harbor just to help fleet owners conserve rubber.

This department, staffed by factory-trained men, has since that time taken over the complete supervision of all tire maintenance problems for hundreds of truck fleets with from 10 to 3500 vehicles each.

Under this low-cost comprehensive point-by-point program job-experienced consultants apply to your tires the rubber-saving "know how" they have acquired through solving literally thousands of other maintenance problems. They check all factors which cause undue tire wear; show you how to eliminate most premature failures; and make mileage-stretching recommendations which cut your costs — sometimes overnight.

Many fleet owners have written to say how amazed they were at the results obtained. Typical of their comments are: "We believe we will show a 25% saving," or "It saves far more than it costs," and "The number of failures has been reduced 60%."

Only a few trained men are available to take over a limited number of additional fleets in certain areas. If you would like to know how this tire conservation plan can be applied to your construction equipment, write the Tire Conservation Department, The B. F. Goodrich Company, Akron, Ohio.

GEARED to WAR TIME CAPACITY

SHOVELS DRAGLINES CRANES

AIR FIELDS · MATERIAL HANDLING · MINING · QUARRIES · LUMBER · HIGHWAYS · CONSTRUCTION

FOR FAST, STEADY PERFORMANCE ON ANY JOB

Cranes, shovels and draglines are giving support to the war effort in many different capacities. The illustration above shows a LIMA Crane equipped with a 55′ boom and a lifting magnet loading scrap metal into cars destined for some plant where the scrap will soon be coming out in the form of tanks, trucks, guns, and other implements of war. LIMA Cranes are especially adapted to this type of material handling work where continuous operation, ease of handling and ability to maneuver in close quarters are essential. Independent clutches, which make it possible to hoist, swing, travel and boom up or down at the same time; extra large drums for long cable life; helical cut gears for smooth, quiet operation and anti-friction bearings throughout, which reduce friction to a minimum are advantages that make extra capacity possible. Be sure to include LIMA in your forward planning.

LIMA

Buy War Bonds and Stamps

LIMA LOCOMOTIVE WORKS, INCORPORATED

Shovel and Crane Division - LIMA, OHIO

NEW YORK, N. Y. PHILADELPHIA, PA. MEMPHIS, TENN.
NEWARK, N. J. PORTLAND, ORE. DALLAS, TEXAS
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SHOVELS, ½YD. TO 3½ YDS. CRANES, 13 TONS TO 65 TONS
DRAGLINES - VARIABLE

EASY does it

On All Concrete Sections

VIBER
Concrete Vibrators

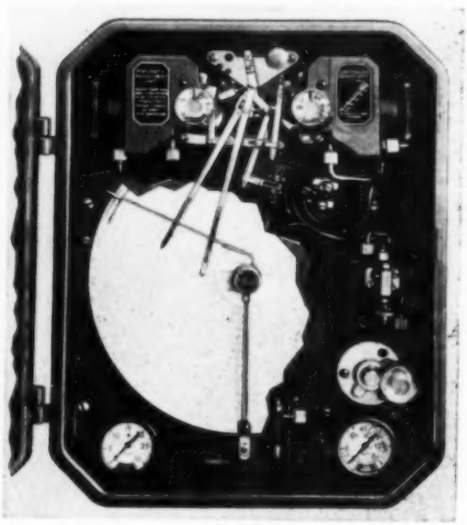
Viber "Viberation" equipment is powerful, rugged, fast . . . *but EASY to carry and handle!* Your operator can work all day long at top speed and efficiency with a Viber Vibrator. Viber's portability means less strain, less fatigue—*more production, lower cost.* Viber offers other exclusive features. Keep ahead of schedule with Viber!

WRITE for our latest catalog describing all the new Viber developments

VIBER COMPANY

726 South Flower Street
BURBANK, CALIFORNIA

PNEUMATIC SET CONTROLLER is introduced with control point automatically adjusted by variations in output air pressure from another remotely located instrument. Is fundamentally a Fulscope controller with additional unit to convert changes in



input air pressure into linear movements of set pointer. Magnitude of linear set pointer movement per pound change in input air pressure is governed by setting of adjustment dial provided in unit, which also provides for set pointer adjustments in either direction for increase in input air pressure and for limiting travel of set pointer within given limits. Instrument is also equipped with manual set pointer adjustment feature.—**Taylor Instrument Cos., P.O. Box 110, Rochester (1), N. Y.**

RIGHT AT HOME

digging rock and stone

YOU COULDN'T put this bucket on a tougher job. For years it has been helping deepen a ship channel,—digging in hard flint bottoms one day, handling rocks and stones on other days. Yet, because its lips and teeth are protected against rapid wear with Coast Metals Hard-Facing, it has been rendering outstanding performance.

Your bucket teeth, lips, runners and other parts also can be given a new lease on life by Coast Metals Hard-Facing! Or, better yet, hard-face your NEW bucket parts and they will serve ever so much better. Then, after slight wear, they can be rebuilt repeatedly and the cost and delay of getting replacement parts eliminated.

Write for "How To Make Construction Equipment Last Longer"

COAST METALS, INC.
Plant and General Offices: Canton, Ohio
Executive Offices: New York, N.Y.

COAST METALS
hard-facing weld rods
MAKE YOUR EQUIPMENT LAST LONGER

★ ★ ★

PORCELAIN ENAMELED TRAYS AND STANDS are designed for photographic and blueprint industry. Trays are made either with oval or flat bottoms with trays and shelf enameled in bright green

from special formula of vitreous enamel to preclude action of fixing and developing solution. Balance of stand is finished in black high gloss porcelain finish. Units are shipped knocked down in convenient package, easily assembled.—**Erie Enameling Co., Erie, Pa.**

THE MARITIME COMMISSION found wood a highly satisfactory construction material in its shipyard program. This huge assembly building at a record-breaking Liberty yard is 240'x860' and contains 143 trusses prefabricated and erected by Timber Structures, Inc.

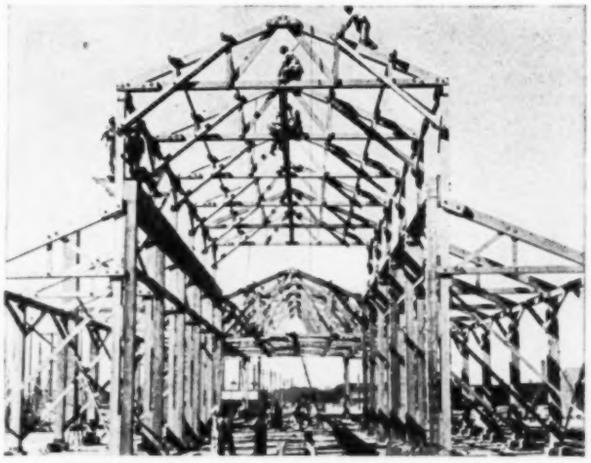
MATERIALS ARE IMPORTANT-

...BUILD WITH TIMBER STRUCTURES

THE WAR has spotlighted the virtues of wood in heavy construction. Shortages in other structural materials have served to emphasize what many engineers and architects already know—that wood, properly designed and prefabricated, is often a sensible answer to construction requirements.

Fulfilling these requirements for timber trusses and heavy framing has been Timber Structures job for years. The virtues of wood—strength, economy, speed in erection, permanence, ready source of supply—have been brought together through the engineering know-how of this organization.

We welcome inquiries on the use of wood or other structural materials for your construction projects. Write to the nearest Timber Structures office for illustrated book on the work we have done, are doing.



ORIGINALLY DESIGNED FOR STEEL by the U.S. Army Engineers, this ordnance repair shop was redesigned by Timber Structures engineers for wood. For this building (60'x220') 28 trusses, columns and bracing were prefabricated and erected. Approximately 50,000 bd. ft. of lumber was used in the building.

MORE THAN 2000 TONS OF STEEL WERE SAVED when Timber Structures supplied trusses and heavy framing for this navy blimp dock. 72% of the Navy's timber requirements for its comprehensive L.T.A. hangar program was entrusted to this organization, involving more than 30 million board feet of fireproofed timber.

TIMBER STRUCTURES
WARD MAYER
INCORPORATED
Portland 8, Oregon — New York 17, N.Y.

Engineering in Wood

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TIMBER STRUCTURES, Inc.
Send Book "Engineering in Wood"

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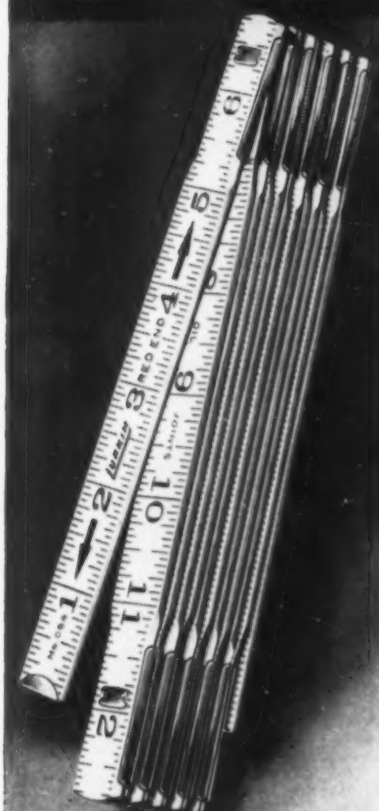
Address _____

Type of building or business . .

If *west* of the Mississippi, send to Portland 8, Oregon. If *east* of the Mississippi, send to 535 Fifth Avenue, New York 17, N. Y.

LUFKIN

066 "RED END"
THE VERY BEST



TOUGH—FLEXIBLE

Superior in quality of materials, in finish and in appearance the Lufkin 066 folding wood rule is the best on the market for regular measuring work. Strike plates prevent wear. Patented lock joints reduce end play, maintain accuracy. Marked consecutive inches to 16ths on both upper and lower edges of each side. Write for free catalog.

BUY THROUGH YOUR DEALER

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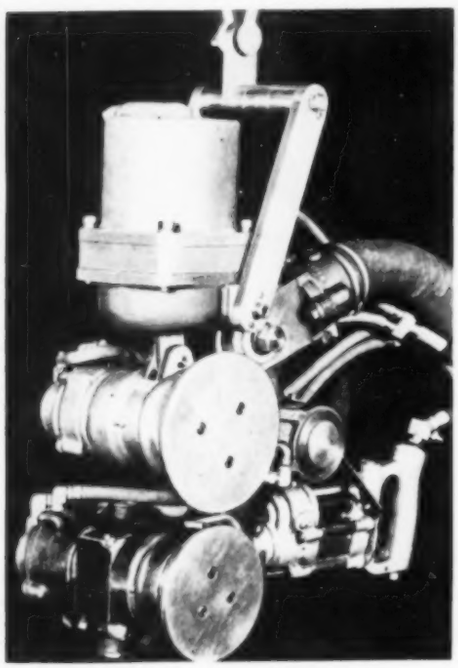
SAGINAW, MICH. New York City
TAPES—RULES—PRECISION TOOLS

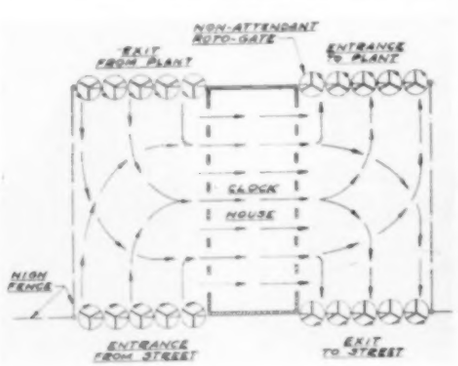
AIR-OPERATED PORTABLE GUN can be used to seam weld parts that are too big to take to machine and large assemblies which are mounted in stationary fixtures. Is designed for welding steel up to two thicknesses of 20 gage including stainless steels. Is universally suspended and can be swiveled about so that operator can weld in almost any direction, horizontally or vertically. Head



is operated by air motor using 42 cu. ft. of air per min. under load. Motor is rated at 2 hp. when run at constant speed. Standard speed is between 48 and 52 in. per min., using standard rolls or wheels. Governor regulates speed of air motor. When gun is in operation, air passing into handle runs motor. Air cylinder of 4½-in. dia. will give maximum pressure of 1,400 lb. per sq. in., with 90 lb. of line pressure. Ample water-cooling facilities are provided. Gun has throat depth of 3 in.; its stroke is ½ in. when wheels are new and 2 in. maximum when they are worn.—**Progressive Welder Co., 3050 E. Outer Drive, Detroit (12), Mich.**

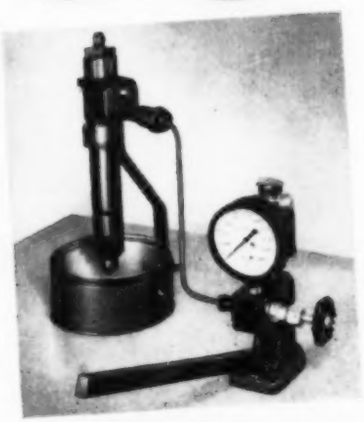
★ ★ ★

TURNSTILE TRAFFIC CONTROL automatically enforces orderly one-way traffic in war plants. Employees enter clock house from street through one-way turnstiles. After stamping time cards, they



ADECO

NOZZLE TESTER
FOR DIESEL ENGINES



HOW TO KEEP DIESEL ENGINES RUNNING AT PEAK EFFICIENCY

With this sturdy, portable, lightweight Adeco Nozzle Tester, any mechanic can easily make quick, accurate tests on injector opening pressure, spray pattern, etc.; and detect stuck needle valves and leakage around valve seats. Adeco advantages have made this America's most widely used nozzle tester. Tests both large and small injectors, on bench or engine. Avoids costly delays and possible damage to engine. Keeps diesels operating at peak efficiency.

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A scientific combination of Powdered Metals for brakes and clutches.

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Pioneers in putting Powder Metallurgy to work for Industry . . . . . .

"GOSH! AM I GLAD I'VE GOT PLENTY OF STERLINGS!"
"Yes, sir — I can thank my lucky stars, I've got plenty of Sterling Wheelbarrows in the yard. For they tell me ALL wheelbarrows are frozen for the Duration . . . not a single new one will be available until after the War. Frankly, I don't know what I would do without my dependable Sterlings on vital war projects. They certainly fill the bill."
STERLING WHEELBARROW CO., MILWAUKEE, WIS.
Look for this Mark of STERLING Quality
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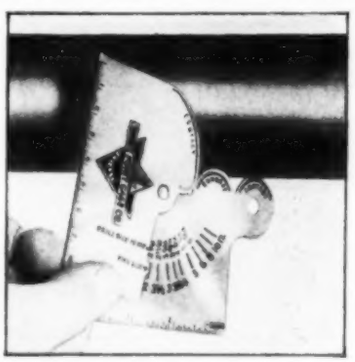
Sterling
WHEELBARROWS
A 4243-¼

It Lifts—or Pushes at Any Angle
Simplex No. 310-A. 15-tons capacity, 22" high, 14" lift. Toe lifts from minimum of 2¼". Weight 74 lbs.
310A
SIMPLEX
The Simplex No. 310-A Emergency Jack performs so many jobs quickly and easily that it has repeatedly proved its worth in the construction field. With its accessories—5 ft. grab hook chain and adjustable cap shoe—it lifts from below floor level, tilts on base for angle jacking, razing walls, etc., and pushes horizontally.
Templeton, Kenly & Co.
Chicago (44), Ill.
Better, Safer Construction Jacks Since 1899
Make Your Jacks Last Longer!
Free bulletin tells how to give them proper lubrication and care.
Simplex
LEVER - SCREW - HYDRAULIC
Jacks

enter plant through another set of turnstiles. Exit is controlled in same way. Traffic through clock house aisles is always in same direction, whether employee is entering or leaving plant. System requires no attendants, makes for orderly traffic conditions, eliminates confusion and speeds up time card stamping.—**Perey Turnstile Co., 101 Park Ave., New York (17), N. Y.**

★ ★ ★

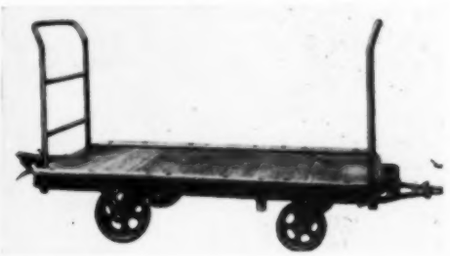
PIPE GAGE accurately measures all sizes of pipe from ⅛ in. to 12 in. Is vestpocket size, light in weight, sturdily constructed of steel, with large easily read numerals etched in metal. Consists of two pivoted steel plates with edges curved at three points for contact with pipe to be measured, together with scale which automatically registers not only pipe size in terms of inside diameter but



drill size for tapping. Measures by simple method of determining outside arc of pipe at three points of contact and, by placing two fixed contact points of one plate against outer contour of pipe and sliding second or movable plate until it makes third contact, marker on face of gage will show accurately size of pipe and drill size. Will measure pipe in any position, even against wall or in corner, and will measure covered pipe if there is small opening where gage may be slipped in. Can be applied in dark places and taken to light for reading. Size when closed is 2½x4¼ in.—**Three-Point Gage Co., 3821 Broadway, Chicago, Ill.**

★ ★ ★

INDUSTRIAL TRAILER Model 610 has standard automatic hitch, but manually operated type can be furnished as optional equipment. Frame is of 3x2½x5/16-in. T-iron, reinforced by two 2x2x5/16-in. longitudinal angles. Floor boards are of select-



ed seasoned 1½-in. hardwood. Rear axle is SAE 1045 carbon steel. Rear axle brackets and other castings are of cast steel. Racks are interchangeable on sides or ends. Diameter of caster wheels is 10 in. with 3-in. face, rear wheels 12 in. with 3½-in. face.—**Rose Mfg. Co., Detroit, Mich.**

9 Factors Affecting the Life of Wire Rope *(Continued)*

(This is number 18 in a series of articles prepared by Macwhyte Wire Rope Company for the benefit of wire rope users everywhere. All articles in this series are yours for the asking. Macwhyte Engineering Experience is available on specific problems.)

* * *

In the previous article of this series, the first four of nine factors affecting wire rope life or service were discussed. They were:

1. Abrasion or Wear *3. Tension or Stress*
2. Bending or Flexing *4. Speed*

As the article pointed out, these four can be kept from doing too much harm (to rope and machine) by frequent checkups.

While some of the four factors mentioned above are normal and to be expected, there are five other "rope saboteurs" which are *not* normal. These can be corrected. They are:

5. Crushing or Mashing *7. Jerking or Shock*
6. Weathering or Corrosion *8. Vibration*
9. Heat or Friction

What can you do to correct them, and thus save steel and time now so urgently needed? Here are specific suggestions.

Crushing or Mashing

Improper winding (criss-crossing) on the sheaves or drums results in crushing or mashing. It *pays* to start the rope winding properly. Keep it from criss-crossing and reduce scuffing against the flanges of the drum and against the under layer to a minimum.

Where rope is loose on the ground (on incline slopes especially) it pays to prevent trucks or equipment from running over the rope. Lubricate rollers, sheaves, and guides so as to avoid undue abrasion. When rope jumps a sheave, stop and replace it before continuing the operation.

Permanent injury to the rope and damage to equipment can result if a rope is operated while out of its proper sheaves. In clamping or fastening the end of the rope use care to avoid needless damage.

Weathering or Corrosion

Wire rope is made of high carbon steel wire and will rust and corrode if not properly protected by a suitable lubricant, especially if it is not in constant use. Proper lubrication keeps the rope flexible and reduces wear as well as affording a protection against corrosion. (See article 10 in this series.)

Jerking or Shock

If there is slack in a rope, take it up slowly before the load is applied. This is where the human element enters the picture. Many a rope is ruined for lack of care on the part of the operator. A quick pickup with as little as 12 inches of slack will more than double the load on the rope and may cause it to snap. Even if the rope doesn't break immediately, it is weakened and breaks later in normal operation. (See article 15.)

Vibration

Vibration of wire rope in service fatigues the steel wires and consequently "tires" them out before they wear out. It is difficult to correct this except where this vibration is caused by faulty equipment and hurried handling. A clutch or brake may chatter and this vibration is multiplied many times throughout the length of the rope. Vibration may cause rope to break where it is dead ended (fastened). Where wire rope is fastened in a socket, continuous vibration will cause the wires to break right at the socket—cutting off a short section and refastening is a cure for this. A smooth pickup and steady operation will do much to eliminate vibration.

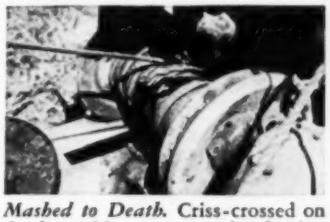
Heat or Friction

Heat changes the structure of steel. In general, it hardens it or makes it more brittle. Friction creates heat. Lubrication helps reduce friction. A stuck roller, a poorly aligned sheave, scuffing against wraps of rope on a drum, scraping on rock or metal creates friction and heat. Wire rope must be kept free to do its job of bending. Heat and friction will change its steel composition and cause it to break up prematurely. Where ropes travel at high speed, watch out for the effects of heat.

Not EVERY Enemy is found on the battlefront. Look . . .

Killed through Carelessness. Literally chewed to death, this rope was ruined before showing any normal wear.

Unnecessary Abrasion. A hoist rope was allowed to saw through a heavy plate. Such waste can and should be avoided.



Mashed to Death. Criss-crossed on the drum, this rope gave only a fraction of the service it might have, had more care been used in spooling.

Why Such Waste? This rope has been cutting a number of grooves in the bucket rim. It will give poor service and increase operating costs.

Your Wire Rope Requirements

The benefit of years of experience based upon servicing equipment similar to yours is gladly given. When you ask Macwhyte for suggestions and recommendations, you can be assured not only of getting "The Correct Rope for Your Equipment," but also a personal interest in helping *you* get the most out of *your* rope.

Feel free to consult with Macwhyte distributors, Mill Depots representatives, or write to Macwhyte Company direct.

MONARCH WHYTE STRAND PRE-FORMED WIRE ROPE

. . . Macwhyte's best grade wire rope, famous for its strength, toughness, preforming, and internal lubrication.

MACWHYTE COMPANY

ARMY E NAVY

WIRE ROPE MANUFACTURERS

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Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope
MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Rope
MACWHYTE Braided Wire Rope Slings
MACWHYTE Aircraft Cables and Tie-Rods

Keep a ROOF over their heads on-the-job!

SKULLGARDS

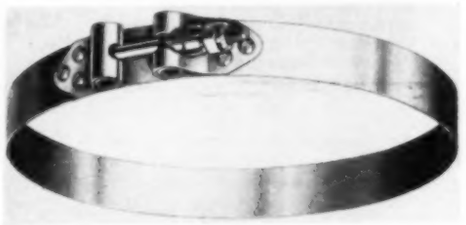
Modern Skullgard head protection is doing a job of war-time calibre throughout the construction industries—guarding heads wherever hazards of falling or flying objects, blows or bumps exist on the job. Light in weight, comfortable to wear throughout the shift, M.S.A. Skullgards interpose the great strength of laminated bakelite between hazards and the worker's head, with tremendous resistance to fracture. M. S. A. Skullgards do not deteriorate from exposure to weather, perspiration, oil, grease, water or common chemicals. They are well balanced and easy fitting on the head, with cradle suspension and flexible sweat band. As the standard work hat of today, "SKULLGARD" is *your* standard specification for head protection! Write for Bulletin DK-11!

MINE SAFETY APPLIANCES CO.

BRADDOCK, THOMAS AND MEADE STS.

PITTSBURGH, PENNSYLVANIA

ALUMINUM ALLOY CLAMP combines maximum strength with extremely light weight. Patented design wraps ends of band over circular cross bar anchor at each attachment to adjustment mechanism, requires no severe forming of material and is thus particularly adapted to use of light



alloys. All loads in clamp assembly are evenly distributed and no tress concentrations are produced. Type D clamp applies uniform radial pressure to periphery of parts over which it is installed. Is particularly suited for use in ventilation, carburetor intake, supercharger, intercooler, and similar installations. Available in all sizes from 2 in. dia. up and in almost unlimited range of special shapes.—**Marman Products Co., Inc., Inglewood, Calif.**

★ ★ ★

SILVER BABBITT is outgrowth of tin shortage and result of research by Battelle Memorial Institute to find babbitt metal that is comparable to tin-base babbitts. Silver alloyed with properly balanced lead-base babbitt has been found to be bondable and corrosion resistant and to retain its hardness at operating temperatures without squeezing out.—**National Bearing Metals Corp., St. Louis, Mo.**

★ ★ ★

FLEXIBLE FASTENER has combined functions of supporting strap and vibration absorber for stationary or movable tubing. Consists of sensitive spring, cone-spiraled and terminating in clip which snaps on to tube or similar unit to be fast-

ened. Is affixed to supporting surface by means of standard or wood screw fitted through cone. Since it flexes in all directions, it can be installed in either lateral or vertical position. Small hose area facilitates placement and gives large working area to cone.—**Packless Metal Products Corp., New Rochelle, N. Y.**

In any Climate... On any Job...

DAVEY COMPRESSORS

RESIST WARTIME WEAR FULL TIME PLUS OVERTIME

WARTIME CONSERVATION POINTERS

By "Davey Dan," the Compressor Man

★

AIR CLEANERS. These filters pay big "service dividends" for the small amount of attention required. Examine one of the filters every day. If it needs cleaning, the others will need it also. Empty and clean the sediment bowl. Fill with clean engine oil, level with bottom bead. Wash filtering element with oil and blow out with air. Never use gasoline or kerosene for cleaning air filters because such practice may lead to explosions in the air receiver.

★

PRESSURE GAGES. Should be checked periodically with a master gage.

★

SAFETY VALVES. Keep them clean and in working order by blowing at least once a day.

★

PACKINGS. Keep all packings on air joints snug enough so that no air is wasted through leakage.

★

FAN BELTS. V-belts should be tight enough to prevent excessive slippage but not as tight as a flat belt used under similar conditions.

★

ENGINE SPARK PLUGS. Keep the electrodes clean and spark gap properly adjusted. Never attempt to bend the center electrode as this will crack the porcelain.

★

Here's Why Davey Compressors Stand Today's Crucial Tests

1. RUGGEDNESS. The outstanding characteristic of EVERY Davey Compressor is the ability to "take it" and come back for more in any CLIMATE or on any JOB. From the smallest pin to the heavy gage steel frame, every part of a Davey Compressor is designed and built so that, like a mountain locomotive, it always has a reserve of rugged endurance to get you "over the hump."

2. CONSERVATIVE SPEED. Davey Compressors operate at moderate speeds, reducing operating trouble, minimizing maintenance costs, and greatly extending the life of the equipment. Engineering leadership, maintained through the years, today offers you the ONLY compressor with GUARANTEED LIFETIME VALVES—guaranteed to operate satisfactorily in any climate . . . on any job — to resist wartime wear everywhere.

DAVEY Portable Compressors are available in the following sizes: 60-105 (illustrated)—160-210-315 cubic foot sizes, with gasoline, Diesel or electric power. Write for catalog showing complete DAVEY line.

★ ★ ★ ★ ★ ★ ★

Some distinguished users of DAVEY Compressor equipment

Barker Bros. Construction Co., Denver, Colo. • Cleveland Railway Company • Connecticut Light & Power Company • France Stone Company, Toledo, Ohio • Globe Contracting Company, Philadelphia, Pa. • Michigan State Highway Department • American Telephone and Telegraph Co. • Philadelphia Transportation Company.

DAVEY Compressor Co.
KENT, OHIO

A war baby becomes a peacetime standard

Sonotube

Concrete Pier Forms

There never was a time when saving TIME MONEY LABOR MATERIALS was not the most practical thing to do.

SONOTUBE—with its enviable war record—will go on making records in the post-war period.

6 Standard Sizes

INSIDE DIAMETER					
8"	9"	10"	11¼"	12"	13½"
SQUARE INCHES					
50.26	64	78.54	100	113.1	144

Smaller sizes available.

Immediate Delivery

Sonotube Concrete Pier Forms of laminated fibre tubing—up to 24' lengths—are readily cut to pier heights on the job.

ARMY E NAVY

SONOCO PRODUCTS COMPANY

HARTSVILLE, S. C. MYSTIC, CONN.

ROCKINGHAM, N. C. GARWOOD, N. J. LOWELL, MASS.

INDUSTRIAL THERMOMETER has plastic case front, yellow back, easy reading thermometer tubing, and malleable iron back. By using plastic case front, weight is reduced and adequate substitute for metal is provided which is not affected by temperatures to which case is subjected under actual service conditions. Either glass or entire front can be replaced at nominal cost. Yellow background of tubing offers best color contrast with mercury, is comparatively easy to produce and involves no complicated construction of bore or lens. Malleable iron has proved satisfactory substitute for brass and is fully protected against corrosion by durable black finish.—**C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y.**

* * *

RUSTPROOFING PROCESS, known as Corronizing, has greatly improved process of application. Consists of electroplating on base stock very thin layer of nickel, approximately 50 millionths of an inch and then plating over this a layer of nickel-zinc alloy, with thickness varying from 100 to 500 millionths of an inch. Corronized strip and sheets will be produced by steel companies for variety of uses. Among industries interested in its use are wire cloth, wire screen, fencing gutters, and spouting, roofing and siding, oil tanks, prefabricated buildings, and pumps.—**Standard Steel Spring Co., Corronizing Division, Park Bldg., Pittsburgh (22), Pa.**

* * *

UNDERWATER CUTTING TORCH, Model 3900, has improved design with many added conveniences. Air mantle is so designed that it limits slagging of tip and adjustments can readily be made under water without irretrievably losing parts. Gas control valves are so located and designed that

they can be more easily manipulated when diver wears heavy gloves and operates in murky water. Torch will start cut and do actual cutting with heretofore unaccustomed speed. is more easily maintained in service and occasional reconditioning can be undertaken with minimum of previous skill or special tools. Weight is as light as sturdy construction permits. All unnecessary external gadgets which would catch in diver's outfit are eliminated. High-pressure oxygen valve lever is conveniently located and provided with easily workable locking device to avoid unnecessary fatigue while cutting in awkward positions.—**Victor Equipment Co., 844 Folsom St., San Francisco (7), Calif.**

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Quick Economical Repair By Welding. Sharp Teeth Save Power. Immediate Shipment On M.R.O. Priorities

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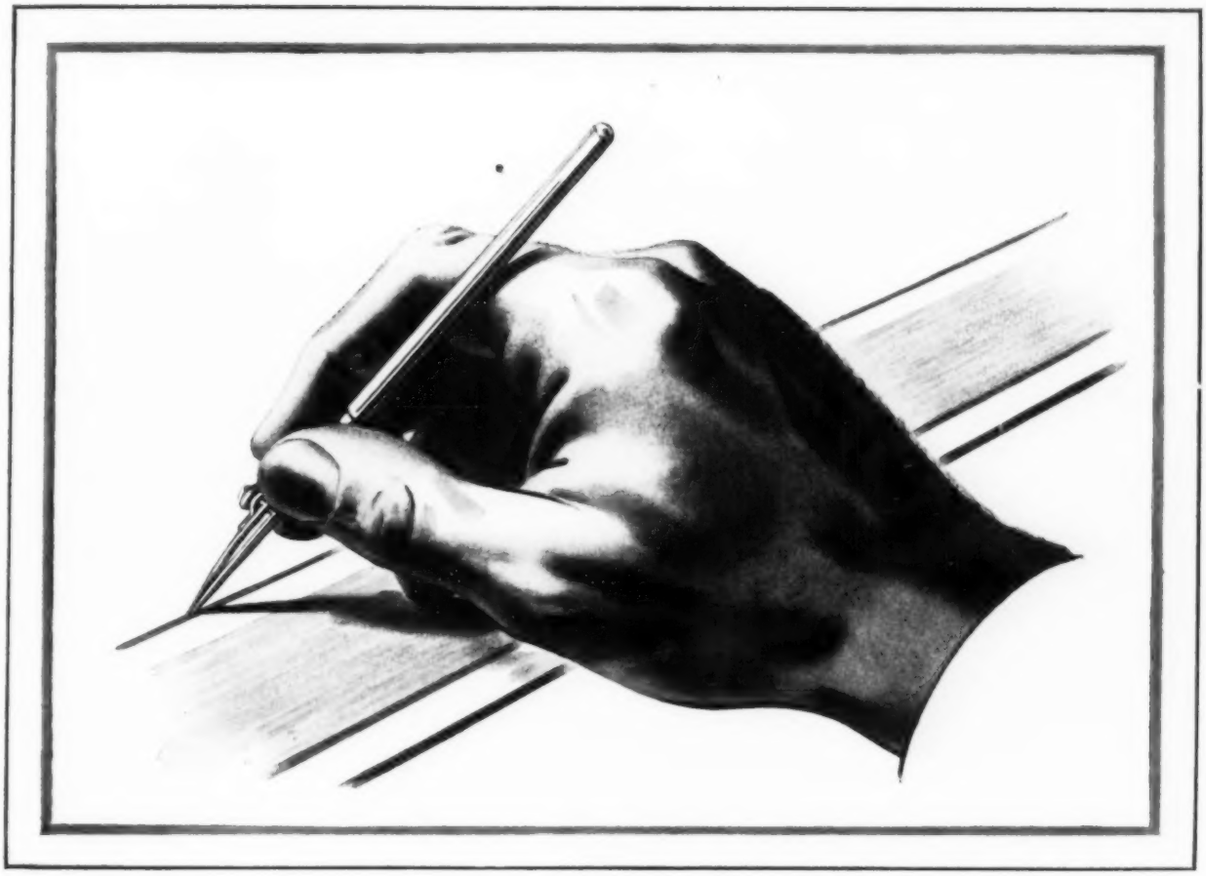

this is
BLUEPRINT TIME!

The welfare of the nation will be greatly benefited, if, when peace is declared, a large volume of both private and public construction can break ground immediately. Construction is the greatest hope for full employment in the postwar period.

In order to get the maximum value from private investment or public works, and avoid waste of manpower, time and money, it is absolutely necessary to have well-planned, soundly conceived projects. This takes time and the time to plan is now. This is blueprint time!

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The employment provided on a planned, needed public works project is a regular job at regular pay. A job on a hastily started project is made work at relief wages.

As you plan, bear in mind that the actual construction by a competent general contractor is another guarantee that the maximum value will be received from the investment.

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FACESHIELD provides durable and convenient protection for face against flying particles. Type H is readily assembled to Type K Skullgard protective hat in field. Clear, transparent visors, 14 in. wide by 6 in. long, of best commercially available

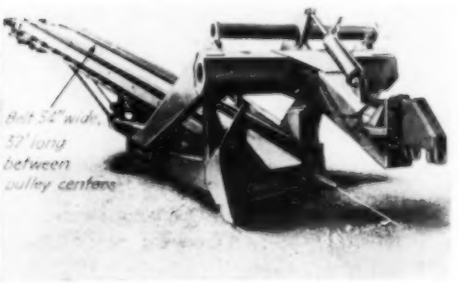
plastic, are fastened to combination unit in novel but practical manner, affording simple and easy means of replacement. Visors are interchangeable. Fiber visor retaining strap is mounted on pivotal joint, allowing upward or downward movement of face-shield to position desired by operator.—**Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa.**

★ ★ ★

STEAM COST CALCULATOR quickly determines steam costs. Plant engineers and superintendents will receive one without cost or obligation if they write company on their business letterhead.—**Cleaver-Brooks Co., 5100 N. 33rd St., Milwaukee (9), Wis.**

★ ★ ★

EARTHMOVING TOOL, designated as Model BV Euclid Loader, is tractor-drawn loading unit for use with large capacity hauling equipment. Can be used efficiently on such jobs as airports, flight strips, dams, highways, plant sites, and soil stripping. Completely coordinated control of both crawler tractor and loader has been achieved



since all controls are mounted within easy reach of tractor operator, so need for additional operator to control loader belt and cutting blade is eliminated. Hauling units are loaded in shorter travel distance because of wide cutting blade with plow point, mold board and wide 54-in. belt. Works in narrow cuts, even with large hauling units. Cuts through surface contours and leaves clean, smooth cut. Has long belt life and low maintenance cost. Is equipped with welded heavy steel box drawbar and universal hitch and yoke.—**Euclid Road Machinery Co., Cleveland, Ohio.**

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"Doing a Man-size Job"

In case you've been wondering why you can't buy a new Insley Excavator these days, don't get the idea that it's because we've stopped building them. As a matter of fact, we're turning out more of them than ever before, but the demands of our armed forces are so great that there simply aren't enough Insleys to go around here at home.

If we were permitted to tell you just how and where on our scattered fighting fronts these Insley Excavators are working . . . if we could, for example, tell you about the tough dirt-and-coral moving jobs they are doing for the Seabees . . . you could readily understand why Insley production is now going exclusively to our fighting men . . . and why Insley Excavators have won the reputation for "doing a man-size job in beating h - - - out of the Japs."

But even if these stories must remain untold for the present, you know, if you have ever used one of them on your dirt moving assignments, that Insley Excavators are *built to do the man-size jobs* . . . with maximum economy and dependability . . . at the lowest operating and upkeep cost. That's why, when this war is over, you'll want to specify INSLEY for your dirt moving equipment. INSLEY MANUFACTURING CORPORATION, Indianapolis 1, Indiana.

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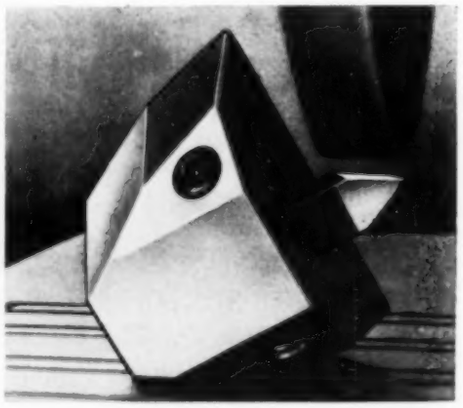
CRANE STABILITY GAGE eliminates danger of crane being overturned when lifting heavy subassembly for warship when cab is 60 ft. above ground and boom extends 100 ft. or more. Gage

DANGER POINT on dial is indicated by H. P. KUHNI, of G-E's general engineering laboratory, who developed gage.

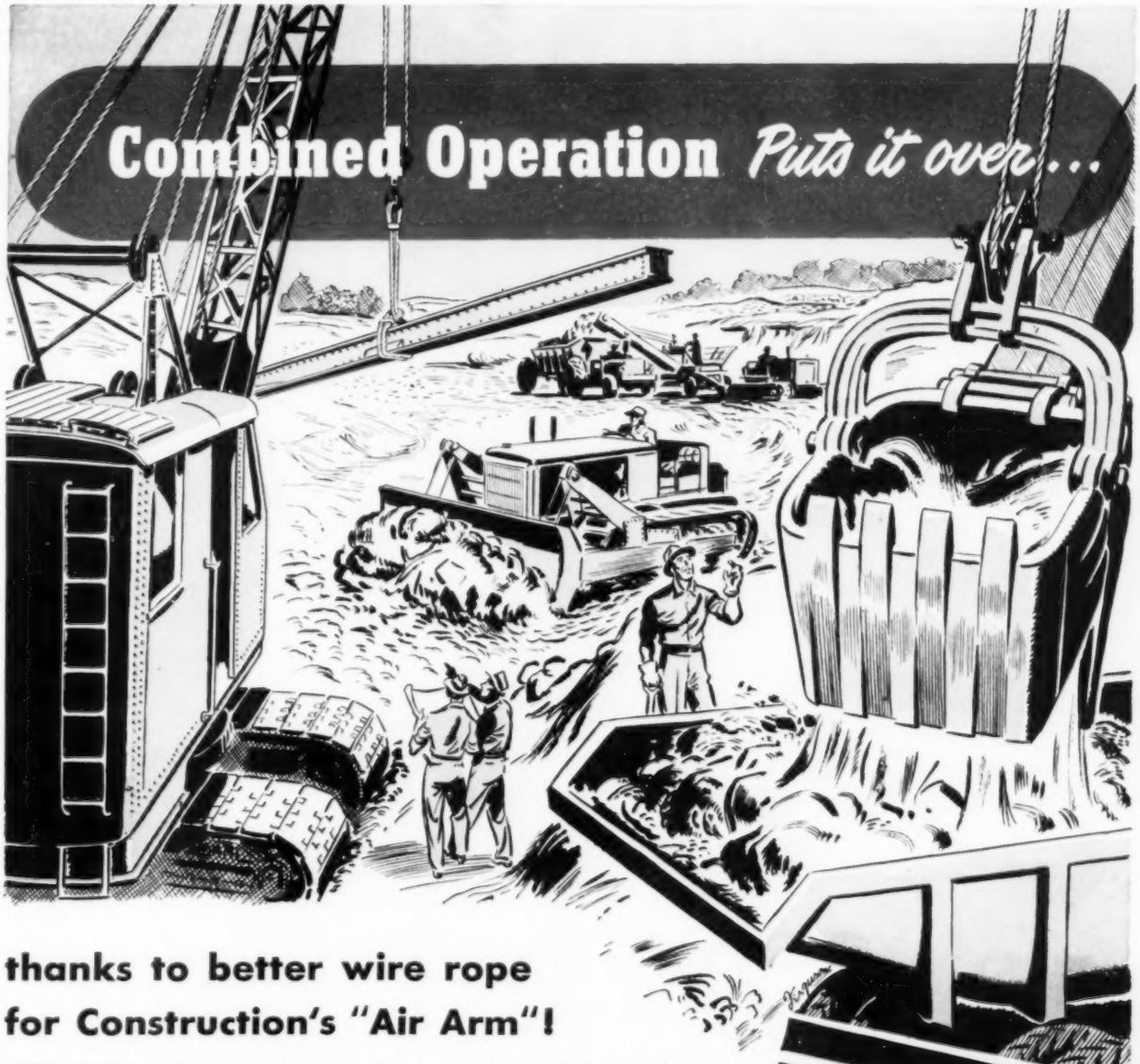
gives operator continuous picture of his margin of safety and automatically stops crane if it takes on too heavy load or boom moves out too far.—**General Electric Co., Schenectady, N. Y.**

★ ★ ★

THREAD-TOOL GRINDING FIXTURE is available for grinding both 60- and 29-deg. threading tool bits with extreme precision. Has no graduated scales or moving parts. Saves time and eliminates waste caused by grinding inaccuracies. Design of fixture makes it specially adaptable for use with magnetic chuck, but it can be easily clamped to



work table. Special tool bit holders will securely hold round or square tool bits of all sizes from 1/8 to 5/8 in. for cutting both right- and left-hand threads. Correct side clearance is provided for and all bits may be ground with or without rake on cutting face. May be used in any surface grinder or cutter grinder and is made of high permeability steel for maximum holding value and long life.—**Robert H. Clark Co., 3424 Sunset Boulevard, Los Angeles (26), Calif.**



thanks to better wire rope for Construction's "Air Arm"!

AIRCRAFT AND TANKS and men are working together at the front, and on industry's battle lines, too, there's *combined* operation . . . of men and machines and wire rope. It means increased striking power. Finishing the job sooner.

Excavators and power shovels, bull dozers and scrapers . . . each with its job to do and doing it *on time* . . . thanks to a tough, easy-to-handle wire rope like Roebling "Blue Center."

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Wire Rope that's right for boom or hoist lines, for drag or trip lines. Pulling with all the knowledge and skill that Roebling engineers have built into it . . . staying on the job longer because of the *extra* stamina that more than a century of wire rope pioneering assures.

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You've got an important job of conserving steel . . . by seeing to it that wire rope is properly cared for on your equipment. Such things as . . .

BREAKING IT IN EASY with light loads at first, to assure proper stretch and better spooling, longer life.

THEN TREATING IT RIGHT afterwards with smooth, gradual starting and braking, proper lubrication and regular inspections.

TO HELP YOU Roebling assembled a wealth of this conservation data on a hardy tag. One fastened to each piece of equipment will remind operators and maintenance men at all times. Printed on heavy stock and varnished to stay clean, copies are yours for the asking. Tell the nearest Roebling office you want Tag "A".

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High pressure lubrication of hard-to-reach fittings—is easily accomplished with a portable, completely self-contained Graco Convoy Luber.

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MINNEAPOLIS • MINNESOTA

RADIAL SAW. known as Uni-Point, is now provided with hardened steel telescoping ram which carries motor and saw back and forth through material. Ram runs in 32 precision-ground hardened steel roller bearings which maintain at all times a

rigid yet smooth finger touch movement of ram. Roller bearings run on hardened steel ways, which further add to easy movement of assembly and safe wear. With nothing to wear out, therefore, saw is offered as lifetime machine to meet heavy production load. Dust cover telescopes with ram, closing it and keeping out dust and dirt.—**American Saw Mill Machinery Co., Hackettstown, N. J.**

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★ Hetherington & Berner asphalt mixing plants, products of the pioneer builder of asphalt machinery in America, incorporate the latest features of design which have been proved in performance. Specifications conform to the most rigid state and city requirements, both as to engineering design and safety regulations. *Write for Bulletin ; a sa*

HETHERINGTON ° BERNER INC.
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BACK STAND IDLER. Model ABS, is used to adapt grinding and polishing lathes to abrasive belt grinding. Makes possible use of endless metal cutting abrasive belt, which is faster cutting and desired finishes are more easily obtained. Heat is reduced because of long belt used and lower temperature operation decreases such hazards as heat, discoloration, warping, and fracturing. Is recommended for grinding welds, flash, generating radii, flat and edge work, cleaning up, and polishing. Any width belt up to 6 in. can be used.—**Porter Cable Machine Co., Syracuse (8), N. Y.**

★ ★ ★

FIRE EXTINGUISHER requires only one hand in operating from moment unit is grasped until fire is out. Model FF-4 features self-aimed, fixed discharge horn, and thumb-operated trigger valve

TO BUILD A HIGHWAY AND BUILD IT FAST!..

Put a LINK-BELT SPEEDER on the job!

These mobile, powerful machines are turning in outstanding records for performance wherever they are in operation. Virtually maintenance-free, they can be kept at their job without needless delays for repairs. Finger-tip control permits easy operation and eliminates fatigue on the part of the operator. Designed and engineered for rugged performance under any and all conditions, Link-Belt Speeder is pointing the post-war way to efficient road building operation.

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(A DIVISION OF LINK-BELT COMPANY)

YOUR TUNNEL LINER Is a "Patriot" Too

(PHOTO BY U. S. ARMY SIGNAL CORPS)

Old, familiar friends have taken new shapes and gone to war. Now ARMCO Tunnel Liner Plates can be purchased only for the most vital war-time projects.

Where metal tunnel liner *must* be used, ARMCO Plates are doing their part and more. They save precious metal because gage for gage this heavy duty liner is stronger (section modulus) than any other plate. Less metal is required to do the work. When completed rings can be spaced to take advantage of partly self-supporting ground, fewer plates may actually be used. Work moves fast; for one man can handle and assemble the light sections with structural wrenches.

If you cannot get ARMCO Tunnel Liner Plates, remember the steel is going into tanks, guns and ships—helping to win battles. After the war these liner plates will be back to help you cut costs and speed tunnel work. Armco Drainage Products Association, 115 Curtis St., Middletown, O.

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TUNNEL LINER PLATES

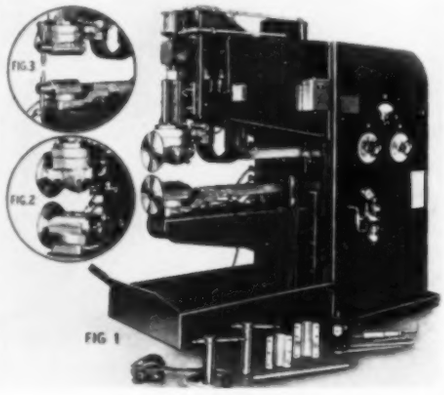
that releases penetrating blanket of carbon dioxide. Operator grasps extinguisher's arched-steel handle while thumb presses trigger directly above. Fire-resistant horn, permanently regulated to fixed firing position, eliminates necessity of making aiming adjustments. Weighs only 4 lb. and is completely safe to operate.—**Randolph Laboratories, Inc., 8 E. Kinzie St., Chicago, Ill.**

★ ★ ★

FORK LIFT TRUCK offers wide range of capacities for efficiently lifting, moving, and stacking all types of materials. Model LT-50 is available in 5,000-lb. capacity with either 104- or 144-in. lift or in 4,000-lb. capacity with 144-in. lift. Maximum travel speed is 8 m.p.h. Loaded lift speed is 40 in. per min. Has 50-in. wheelbase, outside turning radius of 92, overall length, less forks, of 88 in., and center underclearance of 6 in. to permit maximum maneuverability in close quarters, along narrow aisles, and over steeply angled ramps. Standard fork equipment is of 36-in. length.—**Towmotor Corp., Cleveland (10), Ohio.**

★ ★ ★

UNIVERSAL RESISTANCE WELDER for heavy duty incorporates air operated efficiently water cooled, automatic press type welding machine of high capacity. Is adaptable for circular and longitudinal seam welding and, by simple change of electrodes, for spot welding operation. Only upper seam wheel is power driven by 1-hp. motor of 1,425 r.p.m. Speed reduction is performed by means of variable speed drive between limits of ¾-r.p.m. minimum to 2¼-r.p.m. maximum, corresponding



to surface speed of 2 to 6 ft. respectively with 10-in. dia. seam wheel. Power transmission is used for seam welding only. In either seam or spot welding, upper electrode attached to big square ram, sliding in proper guide block, is actuated by double acting air cylinder. Electrode pressure is adjustable by air pressure regulating valve. Air system includes air filter, indicating pressure gage and automatic lubricator. Welding transformer is available in 100, 150 and 200 k.v.a. and larger sizes, 220 or 440 v., 60 cycles, and provides selection of numerous points of heat regulation by heat settings with dial control, permitting wide range of materials and thicknesses. Other ranges of voltage and frequencies are available. All accessories are mounted on solid, completely arc-welded, box-type frame.—**Eisler Engineering Co., 740 S. 13th St., Newark (3), N. J.**

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You'll find new and improved BYERS Draglines and Shovels available to go on your job.

In the meantime, owners of current and older models of Byers shovels and cranes may depend on Byers Parts Service to help them keep present equipment working steadily and satisfactorily.

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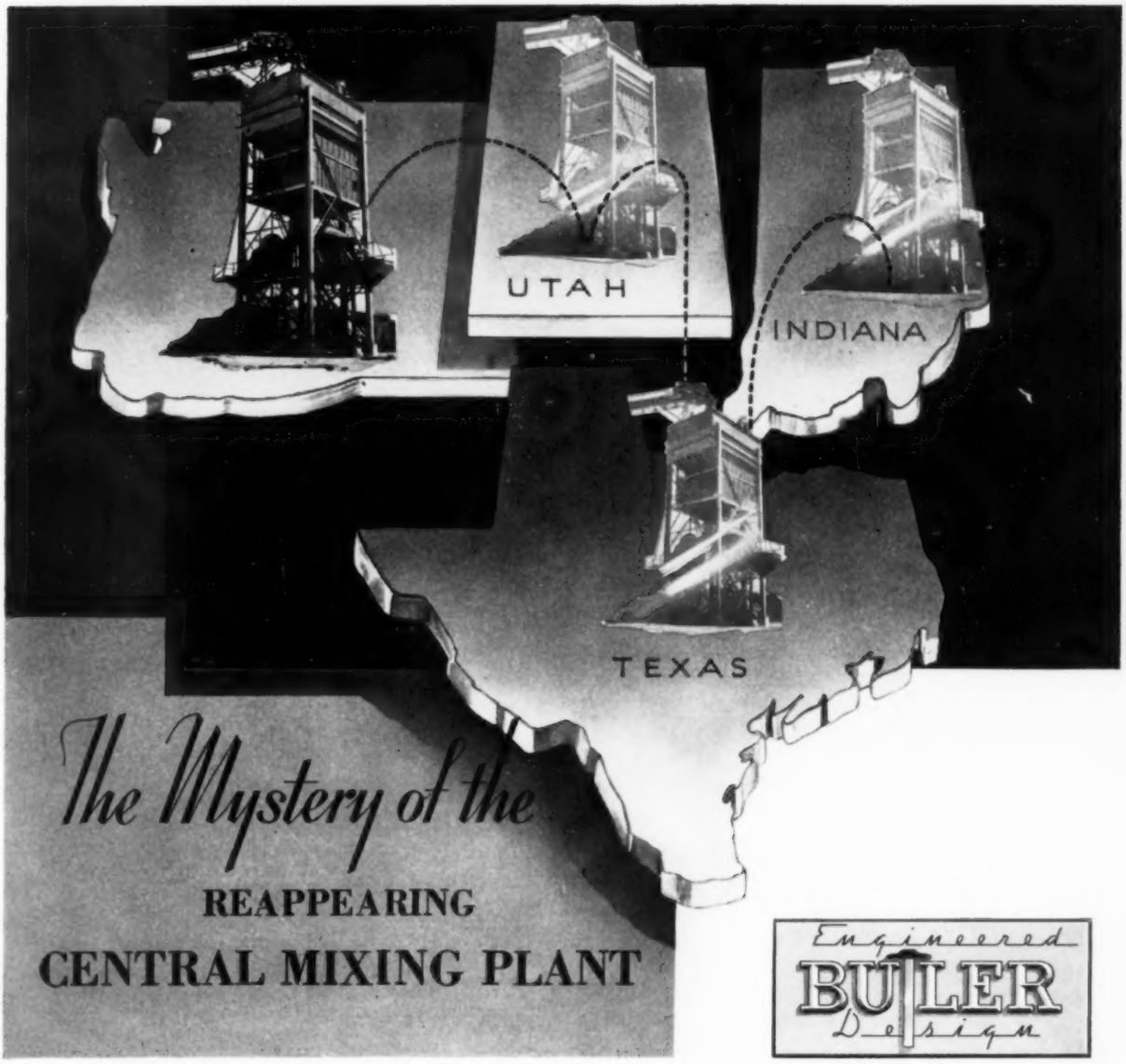

The Mystery of the
REAPPEARING
CENTRAL MIXING PLANT

Engineered
BUTLER
Design

Be on the lookout for a Butler central mixing plant; height about 75 feet; wearing a coat of gray paint; last reported in the State of Washington; has also been seen in Texas, Utah, and Indiana. Has a long record of production — nearly 600,000 cubic yards of concrete poured, and more to come. 150 yards per hour for days on end.

Though it sounds something like a mystery novel, there is really nothing mysterious about the remarkable performance of this plant — it is a Butler Engineered Design. Butler engineers have been designing plants for more than twenty years, plants whose efficiency, dependability, and versatility are built in. No wonder, then, that they are as good on their tenth job as on their first.

If you have a concrete job, large or small, be sure to call upon the Butler engineer. His suggestions are available to you regarding central mixing plants, ready mixed concrete plants, bulk cement plants, batch bins, and crushing plants. The first step toward the most successful job is Butler Engineered Design.

BUTLER
BIN COMPANY
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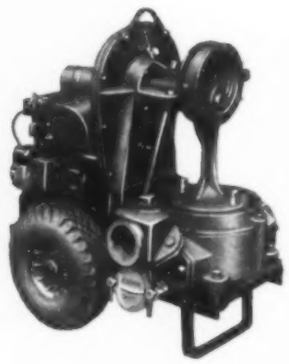
NOT NEW



We emphasize the fact that the Novo Diaphragm Pump is not new! It was offered to the Trade in 1938. Since then, it has proven itself under all normal working conditions, and is today recognized as the leader in the Diaphragm Pump field.

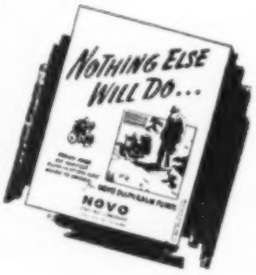
This Pump is thoroughly modern, offering the following features:

ECCENTRIC DRIVE which eliminates moving parts, thus eliminating trouble. Over-all dimensions and dead-weight are greatly reduced for handling ease. All gears are enclosed for protection and safety, and run in an oil-bath for constant lubrication.

TRIPL-LIFE DIAPHRAGM which improves service and cuts down work stoppages. By actual test, the Tripl-Life Diaphragm outlasts 3 to 4 ordinary Diaphragms.

ARM-SIZE CLEAN-OUT which provides easy cleaning. All Pumps must be cleaned — Novo made it easy. You remove the Clean-Out-Plate with a stone or pipe (No wrenches needed). The Clean-Out-Hole is arm-sized, giving access to the Diaphragm chamber and both Valves from a single opening. It takes just 3 minutes to thoroughly clean a Novo Diaphragm Pump.

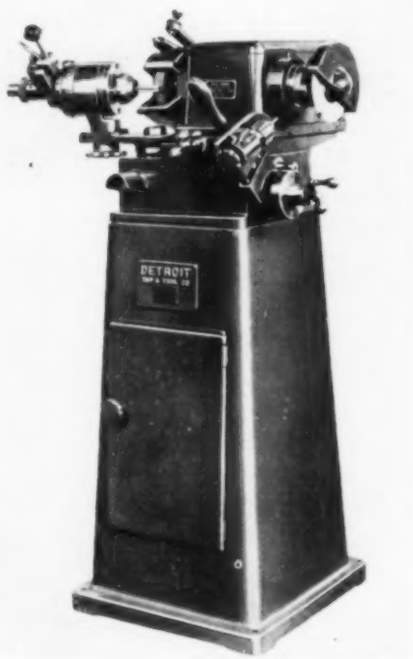
No, the Novo Diaphragm Pump is not new because it has been time-tested by 5 years of field service. Modern, not new, is the word for it.



For the latest Diaphragm Pump Bulletin, write to the Novo Engine Co., 21- Porter Street, Lansing, Michigan. It contains the latest information and specifications and it's free for the asking.

NOVO ENGINE COMPANY LANSING, MICHIGAN

IMPROVED TAP RECONDITIONER features new spindle head that accommodates interchangeably wide range of motor types for various service voltages, phases and frequencies required in industry. High rigidity plus continuous adjustability for grinding tool wear is obtained by mounting spindle assembly on large dovetail ways in

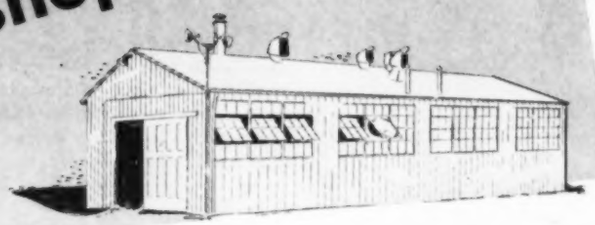


pedestal base. Tap chamfering unit, located at left of machine, is of precision collet type and has been improved to facilitate changing of taps and collets and assure maximum locating accuracy. It will accommodate collets from smallest machine screw size up to 1¼-in. standard tap shank size, including long shank taper taps. Spiral pointing and spiral point polishing operations can be performed by integral units of machine. Internally wired, terminating in line switch at base, ½-hp. spindle motor is controlled by manual switch mounted in base. Standard motors are 220 or 440 v. three phase and 110 v. single phase for either 25- or 60-cycle service.—**Detroit Tap & Tool Co., 8432 Butler St., Detroit (11), Mich.**

★ ★ ★

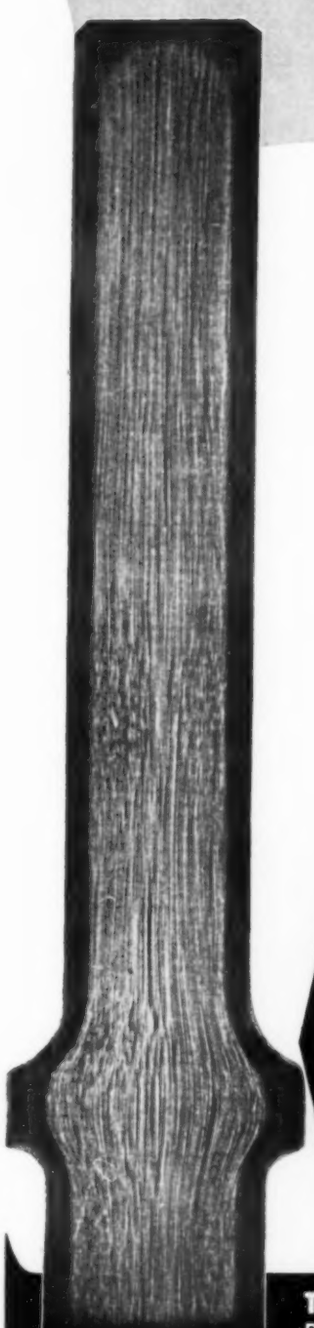
ROTARY WIDENER is combination of one-way plow and rotary unit for snow removal on airports and highways. Front end is one-way moldboard plow, set at approximately 45-deg. angle, with clearing width up to 15 ft. Is of speed-type lifting design, which gives straight line snow discharge for distance beyond rotary. Rotary unit has clearing width of 3 ft., 8½ in. and throws constant stream of snow 75 to 100 ft. beyond

the little forge shop on the hill...



A YEAR or so ago Cleveland engineers decided that our famous "CLEVALOY" paving breaker chisels and moils could be made practically breakage proof by improved forging and heat treating methods. So the Chief selected a group of heady engineers and mechanics to whom he said in effect: "Get over into that little shop on the hill and stay there until you make 'CLEVALOY' tools practically unbreakable!" Separated from the problems of mass production, this group settled down to a task which then seemed none too easy. Today, you should see inside the little forge shop on the hill. Every square foot of its floor area is efficiently jammed with power hammers, lead pots, automatic conveyors, quenching fixtures, inspecting devices, and what not. And from this maze of machinery there roll forth daily large numbers of *"armor-plated"* CLEVALOY chisels and moils—*the best paving breaker steels operators have ever used.*

We have plenty of CLEVALOY paving breaker chisels and moils ready for shipment to purchasers with required priority. First price is a little higher than most—in the long run, they cost less than half. Available in either 1⅛" x 6" or 1¼" x 6" shanks, and in the standard 14", 18", and 24" lengths. At present, only moils and narrow chisels are available with this new *"armor-plated"* forging and heat treating—the others will come later. However, all our paving breaker tools illustrated are available in regular steel, and they are equal to any others on the market.



Unretouched, actual-size section through a CLEVALOY shank. Note the hardness penetration and fiber flow lines. CLEVALOY shanks are *"armor-plated"* against breakage—thousands made by this method, but not one complaint of breakage in the vicinity of the collar.

Moil Chisel | Narrow Chisel | Wide Chisel | Digging Blade | Sheeting Driver | 2" Tamper Bar | 3" Tamper Bar | Clay Blade | Clay Spade | Asphalt Cutter

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THE CLEVELAND ROCK DRILL CO.
Division of The Cleveland Pneumatic Tool Co. Cleveland 5, Ohio
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to insure continuous service

Through American ingenuity and foresight troop movements are now protected from serious dive bomber attacks through the use of small captive balloons.

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A MOUTHFUL AT EVERY BITE

IN WARTIME AS IN PEACETIME

This famous 107-year-old name and trade mark signifies wet weather protection to men serving their Country in various branches of the construction industry and in our armed forces.

TOWER'S TRADE MARK FISH BRAND

LIMITED SUPPLIES of TOWER'S OILED SUITS, COATS and HATS HAVE BEEN ALLOTTED to MOST DEALERS. WE URGE that EVERY EFFORT BE MADE to

'PRESERVE YOUR SLICKER'

Write for our FREE folder giving valuable tips on how to do it.

ASK FOR SPECIAL FOLDER CM

FULL SUPPLIES OF TOWER'S OILED and LATEX TREATED WATERPROOFS WILL BE AVAILABLE AFTER VICTORY

A. J. TOWER CO. BOSTON, MASSACHUSETTS

unit, dissipating it thoroughly to eliminate possibility of snow banks. Moldboard is equipped with hydraulic down pressure so it is possible to put weight of prime mover on cutting edge of plow and shave frozen snow and ice from runway surface. Operates at speeds from 10 to 15 m.p.h. Frame structure of plow is girder type, giving strength without excessive weight. Hitch is of balanced beam construction which results in unusual rigidity and delivers strains to push plates at center of truck which eliminates possibility of "jack-knifing" between plow and truck. Chute is reversible so snow can be discharged to either side on road work.—**Wm. Bros Boiler & Mfg. Co., Minneapolis, Minn.**

★ ★ ★

GRINDER SHIELD has completely redesigned frame molded from high impact resisting plastic material, with electrical parts in completely insulated chamber mounted on adjustable bracket. Provides properly directed light and protection for face and eyes

from flying particles. Light, with push button switch, is focused right on work. Window is of non-shatterable glass and lamps of bayonet type are vibration resisting and set in flush with frame.—**Boyer-Campbell Co., 6540 Antoine St., Detroit, Mich.**

★ ★ ★

BUOYANCY-TYPE INSTRUMENT, known as Level-Buoy, both controls and indicates liquid level. Torque tube transmits level changes to instrument mechanism which eliminates stuffing box with its need for lubrication or packing and gives closed system which eliminates leakage. Tube is interchangeable with ones used in Taylor aneroid manometer and has no internal pivots to cause friction or wear. Handles liquids with specific gravities between .2 and 2.0 and is available in 14-, 32-, 60-, 72-, and 120-in. standard ranges.—**Taylor Instrument Cos., P. O. Box 110, Rochester (1), N. Y.**

"SOMEWHERE IN THE PACIFIC"

THEY'RE CUTTING YOUR CONSTRUCTION COSTS!

OUT where the heat's on, they're turning tropical islands into springboards to Tokyo. It's a tough day and night job and in the process American ingenuity has found ways to cut construction time and costs that *you* can put to good use right now!

From the start, the job called for every productive minute from every machine. These machines sorely needed accurate type of lubrication provided by modern service stations, yet they were located far from such facilities.

So, they brought modern Alemite Portable Service Stations *to* the machines! The saving in machines, man-hours and lubricants was so outstanding that today, the practice is followed on scores of similar construction jobs.

How the Alemite Portable Service Station Saves Machines and Money!

REGARDLESS of where a machine is located, no matter how far from the shops, dependable lubrication is an absolute necessity.

That's why contractors with expensive, irreplaceable equipment to protect are using Alemite Portable Service Stations. They are actually complete lubricating departments on wheels. The equipment includes high and low pressure Alemite Barrel pumps, Alemite Motor Oil dispenser, hose reels, gas engine equipped air-compressor.

Thus, they can handle any lubrication need, anywhere, quickly, accurately and dependably. Also, it is a far easier method, saves many man-hours and helps get jobs done faster.

New catalogs illustrating Alemite Portable Service Stations are just off the press. They contain complete information on both standard and custom built models . . . and give you proof of how this equipment can actually pay for itself in days! Send for your FREE copies, today.

HERE ARE THE FACTS IN A NUTSHELL

During an 18 month check, wear on track rollers on "cats" has been reduced by 32% over hand type greasing.

Due to "barrel to bearing" dispensing, oil and grease consumption has been reduced by 19%.

The equipment serviced includes tractors, bulldozers, caterpillars, shovels, mobile cranes, light plants, trucks, carry-alls and other machines too numerous to mention.

In one Pacific area, comprising a number of projects, 43 Alemite Portable Service Stations are in continual use.

The equipment is mounted on trucks ranging from one ton to seven ton capacity.

The Alemite Portable equipment includes high and low pressure pumps, gas driven air-compressors, reels and 50 feet of air hose and light plants for night operation.

All units were assembled on the job according to plans produced by the construction authorities.

NEW!

FREE catalog illustrating and describing Alemite Portable Service Stations. Write for your copy.

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FORM-TY ENGINEERING FACTS

Since 1933 Richmond's Money-Back Policy SAVES YOU 75% OF YOUR COST

FIGURE IT FOR YOURSELF!

Complete Cost . .	19c
Working Parts Refund	14c
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WHERE ELSE CAN YOU GET ECONOMIES LIKE THIS?

The big thing about Richmond's Pre-Fabricated Form-Tying Devices is their amazing low cost—on any kind of concrete form-tying job. For instance, on a ½" Tyscru you pay 39c and get 31c back on our working parts refund; cost just 8c! Every Richmond Pre-Fabricated Form-Tying Device is correctly engineered so that every part of the assembly plays its full part for assured strength. Not "guessed strength" as in field assembled wire, band and rod ties! And where else can you get the same complete service as you do from Richmond's Job Planning Bureau, with engineering layouts, precise estimates, working suggestions, etc.? Send for your copy of "Form-Ty Engineering" and figure it for yourself. Yours for the asking!

Richmond also makes shear developers, turnbuckles, steel accessories as well as the only complete line of tying devices for concrete form work.

SEE OUR CATALOG IN SWEET'S

RICHMOND SCREW ANCHOR COMPANY, INC.

816 LIBERTY AVENUE • BROOKLYN, NEW YORK

TIME AND LABOR SAVING CONSTRUCTION DEVICES FOR COMPLETE CONSTRUCTION

HIGH-SPEED FREEZETESTER gives quick and accurate information on all anti-freeze solutions approved by government. Model No. 546-T will test all basic solutions of alcohol, methanol and ethylene glycol. Simpler testers are available for single solutions for use where entire fleet uses one kind of anti-freeze.—**Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.**

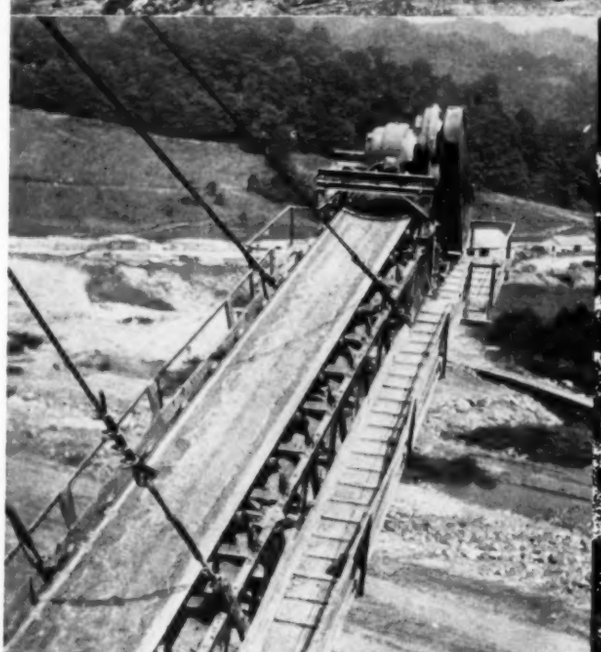
★ ★ ★

PORTABLE RADIAL SAW is built especially for cutting right on spot and can be easily carried by two men. Will cross cut material 14x1 in., 12x3 in. with 12-in. saw, and rip from 0 in. to 25 in. wide. Will also miter, tip bevel, cut off, double miter, and bevel rip. Sturdy cantilever arm

moves vertically and swings horizontally. Yoke rolls along arm, rotates horizontally. Motor in it tilts at any angle. Weight of motor is always in line with center line of yoke, arm and column. Machine is available in 1½-, 2- and 3-hp. sizes. Direct drive motor is protected type, Formex Fiberglas insulated, and provided with sealed ball bearings that require no lubrication.—**DeWalt Products Corp., 100 Fountain Ave., Lancaster, Pa.**

Block Buster

in reverse!



While Allied bombers are pulverizing Ruhr Valley dams we on the home front are constructing them at phenomenal speeds.

Modern construction equipment like the modern bomber is the result of today's finest engineering geared to war's necessities. Hunkin-Conkey Construction Company used Barber-Greene conveyors to place 90,000 cubic yards of processed crushed shale, clay and earth per week in building a 3,093,000-yard embankment for "Big Yock", the Youghiogheny dam in Pennsylvania.

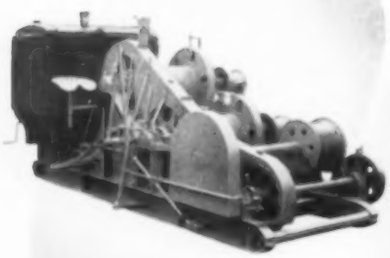
Main conveyor is 275' x 42" and carries material out to stacker. Stacker is 65' x 42" and swings through 180° horizontal plane from top of 100' tower.

43-5

BARBER-GREENE

AURORA, ILL.

for
ALL TYPES
of
CONSTRUCTION



the
AMERICAN
GENERAL PURPOSE
HOIST

In five models covering a hoisting range of from one to five tons, the AMERICAN General Purpose Hoist offers material handling power in a modern, efficient form. Each unit is remarkably flexible: a one-drum model can be expanded in the field to take care of more complex work. Modern design and construction insure great strength and dependability without excess weight.

Full particulars about this hoist — or help in selecting the proper hoist — are yours for the asking.

AMERICAN HOIST AND DERRICK CO.
SAINT PAUL, MINNESOTA
1883 - 1943
AMERICAN TERRY DERRICK CO.
SOUTH KEARNY, N. J.
FOR SAFETY

ROUND-HOLED CORED DIES are available in stock sizes as small as .004 to .007 in. Maker claims new dies eliminate necessity for either initially higher die investment or of piercing blank dies by mill to produce diameters of wire down to .010 in., saving valuable machine and man-hours in die room either at mill or in shop of supplier. New dies are available with standard size R-2 Carboloy nibs and casing sizes of 1x9/16 in. or 1½x9/16 in.—**Carboloy Co., Inc., Detroit, Mich.**

★ ★ ★

TURBINE REDUCTION UNITS are available in 26½- and 37-hp. base ratings. Both types are designed to operate on input speeds of 5,000 to 6,000 r.p.m. Two basic units are available in selection of standard ratios ranging from 3½ : 8 : 1.

Self-contained, they are completely equipped with built-in oil pump and oil cooler, oil filter and pressure relief valve, pressure gage, thermometer, and oil level gage. Lubrication system is of force feed type.—**Michigan Tool Co., Cone-Drive Division, 7171 E. McNichols Rd., Detroit (12), Mich.**

★ ★ ★

NON-CORROSIVE PAPER is available for packaging machine parts for overseas transport. Known as KD8-CO17, it protects parts against salt water, corrosion, and climatic and atmospheric changes. Can stand rough handling and permits speed and ease of wrapping. Is greaseproof and can be heat sealed into bags. Is available in range of stock sizes. Has approval of Forest Laboratories, government testing agency.—**Criterion Paper & Twine Co., 345 W. 36th St., New York, N. Y.**

★ ★ ★

MOVABLE PARTITION is of unitype construction which saves time and labor in erecting and rearranging office quarters. All panel and door units are interchangeable and demountable so given assembly can be rearranged and changed to meet space requirements. All glass and solid panels are also interchangeable to afford vision or privacy as desired. Standard stock sizes are 7, 9, and 10½ ft. "Steelike" finish is rubbed smooth to produce beauty and durability.—**Martin-Parry Corp., York, Pa.**

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Soil-cement airport parking apron
Asphalt-emulsion stabilization on city street
Soil-cement highway
Mixing aggregate and bitumen
Pulverizing scarified oil mat
Re-mixing scarified oil mat
Mixing fresh bitumen into scarified material pulverized to original size with SEAMAN MIXER
Damp-mix processing on soil-cement street

In the

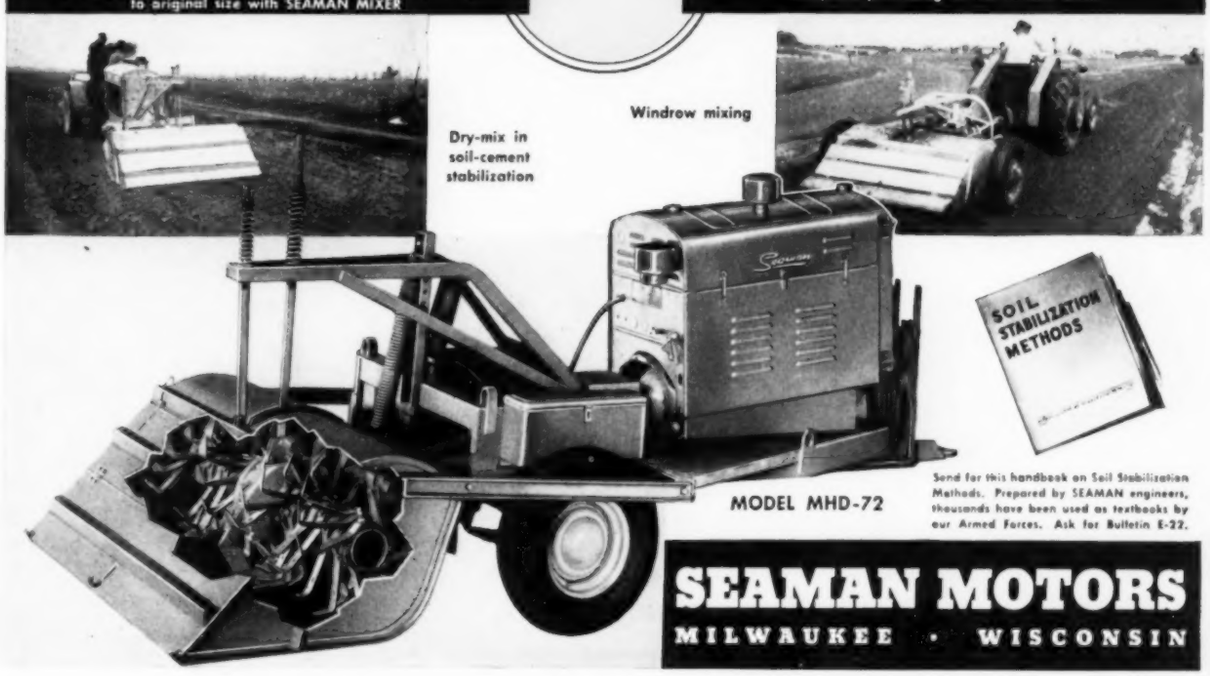
FINAL SHOW DOWN

it's **JOB-PERFORMANCE THAT COUNTS**

That's Why

SEAMAN PULVI MIXERS

Dominate the Field



MODEL MHD-72

Send for this handbook on Soil Stabilization Methods. Prepared by SEAMAN engineers, thousands have been used as textbooks by our Armed Forces. Ask for Bulletin E-22.

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BACK THE ATTACK BUY WAR BONDS

* For their size, MALL Vibrators place more concrete per hour than any other vibrator.
* They place a stiffer mix with important savings in cement, sand and labor.
* MALL vibrated concrete assures a better bond with reinforcement . . . is free from honeycombs and voids . . . permits earlier stripping of forms . . . and makes a stronger, water-tight job.
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* MALL Vibrating elements are ruggedly constructed for long service with welded, special metal tips that withstand abrasive action.
* Variable speed gasoline engine operates 8 other tools easily interchangeable with the vibrating element.

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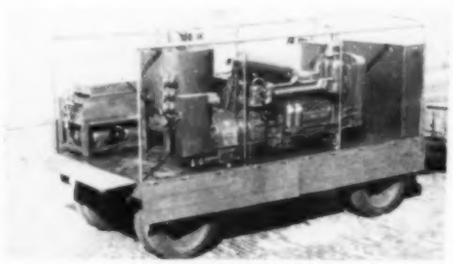
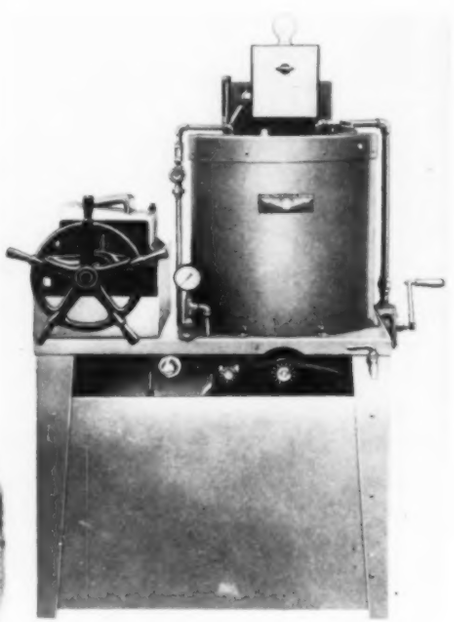
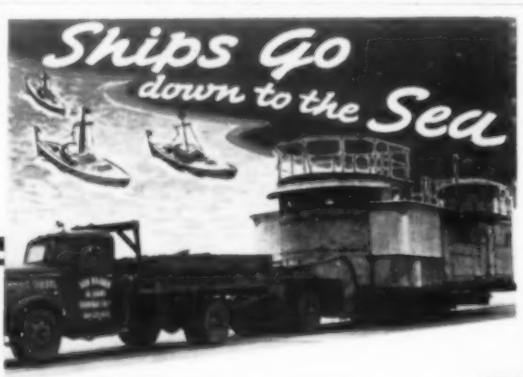
LUBRICATING OIL RECLAIMING TRAILER UNIT was designed for Marine Corps use back of lines as troops advance. Mounted on trailer is standard type Y-M reclaimer, diesel-electric generating set, clean oil storage tank, fuel oil tank, and waterproof storage bins for refinery earths, filter papers and spares. Charging pump conveys dirty oil from drums on ground to heating tank, where it is brought to sufficient temperature in intimate contact with refinery earth to dissipate volatiles. Heating process is controlled by thermostats and when proper temperature is reached, oil is dropped into transfer tank, then forced through two-stage filter by compressed air and out to clean oil receiving drums. Reclaimers are built in eight sizes to meet any requirements for purification of dirty lubricating oils from diesel, automotive, and aircraft engines, as well as for hydraulic, vacuum pump, and transformer oils. Is of contact earth filtration type, utilizing common refinery earths available on open market and designed to remove non-lubricating volatiles by slow heating and solid and asphaltic materials by filtering. Is capable of removing fuel dilution, water, acids, solid and colloidal carbon, and dirt, thus restoring used oils to substantially same values of fire, flash, viscosity, color, neutralization number and precipitation number as new oil.—**Youngstown Miller Co., Sandusky, Ohio.**



TRAILER-MOUNTED RECLAIMER aids conservation and transportation of lubricating oil for use by Marine Corps back of lines. Also on trailer are electric generating set, clean oil storage tank, fuel oil tank, and waterproof storage bins.





on
ROGERS TRAILERS

AMERICA'S shipbuilding industry will launch more ships in 1943 than all the rest of the world combined.

ROGERS TRAILERS are a vital link in the mass-production method of ship construction for they are transporting heavy machinery . . . boilers, bulkheads, engines . . . speeding Victory ships down to the sea!

ROGERS TRAILERS are serving efficiently on the homefront too and new models which will be available when war contracts are completed, will be even more efficient than the multitude which have been so successfully operated by industry for many years.

EXPERIENCE *builds 'em*
PERFORMANCE *sells 'em*

ROGERS BROS. CORP.
ALBION, PENNA.

No longer is cold weather the bugaboo it used to be to concrete construction. Every construction man knows that with proper precautions concreting can be safely carried on through winter.

With Lehigh Early Strength Cement, winter concrete construction has another safeguard . . . one that also speeds up construction and with a savings in costs. For concrete made with Lehigh Early Strength Cement cures beyond the danger of damage by frost 3 to 5 times faster than when made with normal Portland cement. This quick curing brings other benefits. The concrete reaches service strength in ⅓ to ⅛ the time taken by normal Portland cement concrete poured under the same conditions . . . delays are eliminated because the concrete can be put into service quickly, which helps maintain a continuous construction schedule . . . forms can be removed more quickly and re-used, saving on form costs . . . the expense of heat protection, when needed, is lowered 50% to 70% because of the quicker curing.

The Lehigh Service Department will send you, free on request, data on the practices recommended for cold weather concreting with Lehigh Early Strength Cement. You are invited to send for this helpful information.

Lehigh
CEMENT

LEHIGH EARLY STRENGTH CEMENT
for **service-strength** concrete in a **hurry**

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Victory begins *Underground*

YES, the underground of which you are a part, Igor and Petrov, has played a vital part in disrupting the plans of the Nazi Supermen in Occupied Russia.

The Red Army, strengthened by American-made tanks, guns and planes, is slowly crushing the ruthless invader back . . . back past the Dnieper River Valley where you were once free men. Other Allied Nations are crowding your captors from the East, South and West.

Over here skilled men are engaged in another underground activity—that of blasting out the coal and ore and stone that go to make up the fighting equipment of the Allied Nations. We make the Ensign-Bickford Safety Fuse and Primacord-Bickford Detonating Fuse so essential to essential blasting.

Victory Begins Underground!

L-P

THE ENSIGN-BICKFORD CO.
Simsbury, Connecticut

Primacord-Bickford *Detonating Fuse*

NEWS FROM MANUFACTURERS

About Their Products

The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.

PORCELAIN ENAMEL—**American Rolling Mill Co.**, Middletown, Ohio. (28 pp., illustrated) Gives useful information for product engineers, designers, architects, and others interested in use of porcelain enameled iron. Includes engineering information on abrasion and friction resistance, weather resistance, resistance to chipping, resistance to thermal shock, color fastness and range, finishes available, chemical resistance, and physical properties, which are compared with those of many other materials—glass, ceramic white ware, thermo-setting plastics, hard rubber, aluminum and its alloys, nickel, copper, zinc, iron alloys, and cast iron. Drawings illustrate "do's" and "dont's" of designing products that are to be porcelain enameled. Importance of highly refined sheet iron with special surface characteristics and physical properties best suited for porcelain enameling is subject of another section. Brief explanation is given of methods of making porcelain enamel, as well as a bird's-eye view of porcelain enameling industry and its production facilities.

★ ★ ★

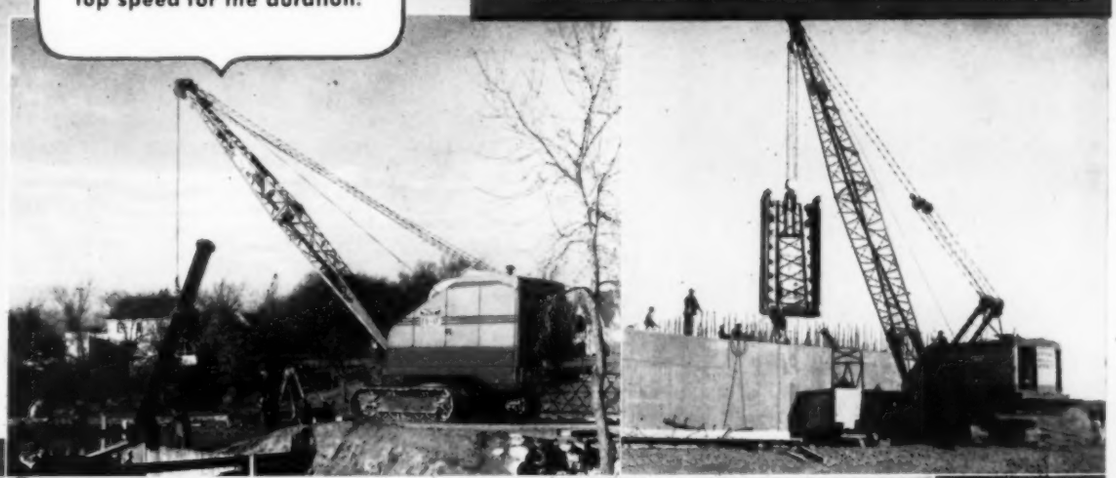
PAINT SPRAYING RULES—**Eclipse Air Brush Co., Inc.**, 400 Park Ave., Newark (7), N. J. (Wall chart) Shows how to save paint, air, time, power, fuel, and equipment and reduce time lost because of sickness or accident, and improve results. Rules apply to all types of spray equipment.

★ ★ ★

DEPENDABLE ANCHORING DEVICES — **Chicago Expansion Bolt Co.**, 2240 W. Ogden Ave., Chicago (12), Ill. (20 pp., illustrated) Illustrates and describes complete line as guide in selection of right product for every anchoring requirement. Gives specifications and data on expansion nuts, expansion bolts, anchoring units, malleable lag screw shields, malleable machine bolt shields, double machine bolt shields, lead wood-screw shields, toggle bolts, theater-style expansion bolts, hook bolts, and drilling devices.

Make your CRANE Last longer

Wartime construction puts heavy demands on crawler cranes. Here are a few suggestions that may help you keep your rig going at top speed for the duration:



- Keep surface of drum well lubricated for smooth rope spooling.
- Keep brakes and clutches in good adjustment.
- Inspect the entire machine regularly and remedy any troubles while they're still small. Remember to inspect sheaves, watching grooves, guards and lubrication.
- Follow manufacturer's recommendations for lubrication.
- If there are long waits between lifts or moves, shut off engine, never let it idle for long periods.
- Use proper rope length for each job. A too-long rope means excessive overwinding and that increases wear greatly. Rope life can often be increased by reversing ropes end for end.
- Keep close watch for frayed or damaged cables.
- If boom hoist operation is not necessary on particular job, it should be tried and adjusted at regular intervals.
- Call on your distributor for help with special service or maintenance problems.

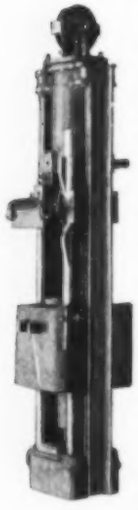
ARMY E NAVY

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

RUGGED STRENGTH
SIMPLE DESIGN
Easy Operation
Positive Action
ECONOMICAL
—to operate
—to maintain

WARRINGTON-VULCAN
SINGLE-ACTING
STEAM
PILE HAMMERS



Drive wood, concrete, or steel piles this low-cost, dependable way. For almost 57 years the Warrington-Vulcan has been demonstrating its great ability and many important jobs in the United States and other countries. It operates at a medium steam pressure and delivers a moderate frequency of low velocity blows from a relatively heavy ram. Free from mechanical troubles, you are assured of regular and continuous action. Write for complete details.

VULCAN IRON WORKS
Since 1852
331 North Bell Avenue
Chicago Illinois

VICTORY MAINTENANCE PLAN — **Westinghouse Electric & Mfg. Co.**, East Pittsburgh, Pa. (Portfolio) Includes 18-p. operating guide booklet that covers complete information on necessary steps for maintenance and inspection programs; mechanical and electrical check charts based on frequency of inspection; and sample form of recommended diesel engine operating log which, when filled out, will serve to determine proper scheduling of inspection intervals to meet individual plant requirements. Guide contains operating hints for engines and auxiliaries and electrical equipment, as well as check list to detect and eliminate mechanical and electrical trouble.

★ ★ ★

SPEED-UP TOOLS AND EQUIPMENT—**Ideal Commutator Dresser Co.**, Sycamore, Ill. (92-pp. illustrated handbook) Covers motor maintenance equipment, industrial electrical equipment, variable speed transmissions, machine tool accessories, and wiring devices and tools. Chapters are: (1) Maintenance Equipment; (2) Coil Winding Equipment; (3) Wire Insulation Strippers; (4) Portable Industrial Cleaners; (5) Brazing and Soldering Tools; (6) Safety Tools and Equipment; (7 Flashlight Storage Battery; (8) Fuse Devices and Tools; (9) Wiring Devices and Tools; (10) Electric Marking Tools; (11) Machine Tool Accessories; and (12) Variable Speed Transmissions.

★ ★ ★

EXPANSION ANCHORING DEVICES—**Chicago Expansion Bolt Co.**, 2240 W. Ogden Ave., Chciago (12), Ill. (20-p. catalog) Presents helpful data for all users of expansion anchoring devices. Is completely illustrated with full installation instructions. Items covered include expansion bolts, expansion nuts, anchoring units, toggle bolts, lead wood-screw shields, lag screws, shields, single and double machine bolt shields, hook bolts, and drilling devices.

★ ★ ★

IN SERVICE ON ALL FRONTS—**U. S. Plywood Corp.**, 616 W. 46th St., New York, N. Y. (12 pp., two color) Emphasizes many new developments which war has brought to plywood industry and stresses peacetime application of these developments. Includes more than 30 photos showing flat, molded, metal-faced, waterproof, and tubular plywood products. Army's new metal-faced plywood powder box is given special attention as well as molded tubular radio masts made for Signal Corps. Several pages are devoted to aircraft parts made of plywood, while another page shows recent developments in boat field. Plans for peacetime use of plywood are given prominence and attention is directed to research work now being done in company's laboratories.

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CONTINUOUS
Pumping
under all conditions

Contractors standardizing on Gorman-Rupp Pumps are getting extra hours instead of costly shut-downs due to pump failures. There's a DEFINITE REASON. More dependable. No priming jet to clog. No control valve to jam. This is important today when every piece of equipment has to take a beating. Let your distributor show you why more contractors are switching to Gorman-Rupp's every day.

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THE GORMAN-RUPP CO., MANSFIELD, OHIO

GORMAN-RUPP
Self-Priming Centrifugal Pumps

Free INSTRUCTION MANUAL FOR YOUR MAINTENANCE MEN

The REVISED fifth edition of this Oakite Automotive Servicing Manual contains many time-saving tips and short cuts for handling essential maintenance work on your construction and road-building equipment.

In its 36 data-filled pages you will find full instructions on FAST-WORKING, specialized Oakite materials and techniques for degreasing repair parts, cleaning motors and chassis, reconditioning clogged radiators and cooling systems, preparing equipment for repainting . . . and many other jobs. Send for your copy of this NEW, FREE manual TODAY!

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Technical Service Representatives Located in All Principal Cities of the United States and Canada

OAKITE *Specialized* CLEANING

Never before in any war...
motorized equipment that pulls itself up by bootstraps *of modern*
Preformed wire rope
Dragging a heavy field piece through trackless wilderness, the sturdiest "cat" may bog down and stall in deep and slippery mud.
In this emergency the line of Preformed Wire Rope on the front winch is securely anchored to a rock or tree up ahead. Then, with a strong and steady pull, the "cat" inches its way out of trouble and resumes its journey.
Preformed Wire Rope handles these patient, ponderous jobs as well as the hair-trigger reactions of airplane controls—as easily as the thousands of everyday jobs. Preformed Wire Rope wears longer, speeds work, reduces accidents, slashes costs. If you haven't tried Preformed Wire Rope—
Ask your own wire rope manufacturer or supplier

FASTER HOIST!
FASTER SWING!
WITH A PAGE
Two-Engine
DRAGLINE
● One PAGE Horizontal Diesel Engine handles the loading and hoisting. The other is free to provide power for the electric swing. Add the benefits of the PAGE Automatic Dragline Bucket . . . Results . . . lively action, time saved, more dirt moved per shift, per month, per year.
Write for Details without Obligation
Page
Two-Engine DRAGLINES
PAGE ENGINEERING COMPANY - c/o Clearing Post Office, Chicago, Illinois

WHAT MAKES A GREASE—**Sun Oil Co.**, Dept. 73, 1608 Walnut St., Philadelphia (3), Pa. (12 pp., illustrated) Briefly discusses standards by which good grease should be judged. Points out various factors which should influence selection of proper grease for specific job. Describes outstanding characteristics of various Sun greases that have been developed for different uses, including adhesive pressure grease, gun grease, pressure system grease, roller bearing grease, and mine lubricants. Cites specific applications of these greases and results obtained. Explains service offered through Sun Oil engineers in study and solution of many and varied grease problems encountered in every type of plant.

★ ★ ★

BALL-BEARING PRACTICES FOR SHOP MAN—**Marlin-Rockwell Corp.**, Jamestown, N. Y. (Portfolio containing 27 illustrated bulletins) Subjects covered include: (1) Things every shop man should know about ball bearings; (2) Necessity for constant vigilance over cleanliness and proper handling of ball bearings in receiving and stock rooms; (3) Handling bearings during assembly; (4) Assembling of bearings on shaft—preparation of shaft and mounting of bearings; (5) Checking bearings after installation and assembly by hot oil and hot air methods; (6) Preparing shafts for ball bearings; (7) Shaft shoulders and shaft fillets; (8) Grinding procedure for shaft shoulders and bearing seats; (9) Instructions for removing bearings from shaft; (10) Bearing housings; (11) Ball bearing housing covers; (12) Seals for ball bearings—plain, grease-groove and felt types; (13) Seals for ball bearings—flange type; (14) Seals and slingers for ball bearings; (15) Concentric spring pressure seals; (16) Lubricants for ball bearings; (17) Grease lubrication of ball bearings; (18) Oil lubrication of ball bearings; (19) Oil lubrication of ball bearings—high speeds; (20) Types of ball bearing mountings; (21) Duplex bearing mountings; (22) How to adjust preload of duplex bearings; (23) Shaft and housing fits; (24) Snap-ring bearings; (25) Snap-rings used in ball bearing mountings; (26) M.R.C. ball bearing interchangeable table; and (27) Lock nuts for ball bearings.

★ ★ ★

LOAD COMPUTATION MANUAL—**Marlin-Rockwell Corp.**, Jamestown, N. Y. (72-p. booklet) Contains methods for computing imposed loads on bearings from available data. Its use enables any engineer or draftsman to compute loads easily and accurately, even without any previous knowledge of subject. All that is necessary is to follow model examples or to substitute in formulas. Provides convenient reference book for those who are occasionally obliged to figure loads and is recommended because of time-saving methods to engineers who frequently do this kind of work. Sample problems cover all ordinary cases. Procedure is described for spur, bevel, helical and worm gears.

Contractors Count on These Tools . . .

. . for sawing 10 times faster than by hand

BLACK & DECKER Quick-Saws are powerful, flexible, designed to cut through wood, composition materials and metals 10 times faster than these jobs can be done by hand. Three Quick-Saw models are available for every sawing job . . . they can be equipped with abrasive discs to cut through stone, ceramics, thin ferrous metals; or with crosscut, combination planer, miter, friction and nail-cutting blades. Here the Quick-Saw is cutting through tough, corrugated asbestos cement easily. Absolutely safe . . . Quick-Saw housings are light, strong, perfectly balanced for easy handling. Sturdy telescoping guard.

. . hammering in concrete

BLACK & DECKER Electric Hammers speed up any cutting or drilling operation that requires hammer action. Here a workman uses a powerful, light-weight Hammer to drill holes in concrete floor for metal partition base installations. Four brute Hammer models . . . 15 kinds of Hammer tools . . . for faster, more efficient channeling, gouging, tamping, drilling and demolition operations in concrete, stone, brick or wood.

. . faster drilling and boring

BLACK & DECKER makes a complete line of heavy duty Drills, from ¼" to 1¼", for driving Hole Saws, boring through heavy timbers and planking, drilling in hard alloy metals, doing precision work in bench drill stands, etc. Here a workman is drilling wood framework on war construction project. Contractors depend on Black & Decker Drills to save time in all kinds of drilling and boring operations.

BLACK & DECKER TOOLS can be bought *on the job* from your nearby Distributor. For complete tooling information or help, consult him. The Black & Decker Mfg. Co., 759 Pennsylvania Ave., Towson-4, Maryland.

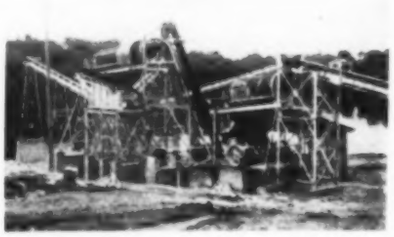
LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC **TOOLS**

Construction Speeded
with the
New
CLIPPER
HOIST
FREE
TRIAL
on Your
JOB
PORTABLE AND EASY TO OPERATE
You'll want the New Portable Clipper Hoist on your job . . . Quickly set up ready for use. The Clipper Hoist is operated by only one man!
FEATURES AUTOMATIC UNLOADING
FASTER . . . Brick, tile, concrete and flue lining can be hoisted to greater heights, without fatigue.
FLEXIBLE . . . Practical for every job.
THE CLIPPER MANUFACTURING COMPANY
4040 CHOUTEAU
ST. LOUIS, MO.
District Offices and Warehouses: Philadelphia, Kansas City, Austin, Tex.

Reliance *is Ready for the End of the War*



RELIANCE PRODUCTS

Rock Crushers, Bucket Elevators, Revolving Screens, Storage Bins, Pulverizers, Chip Spreaders, Heating Kettles, Bin Gates, Feeders, Belt Conveyors, Grizzlies, Air Separators, Sand & Gravel Spreaders, Wash Boxes.

RELIANCE Washing-Screen Plants, Crushers, and Conveyors are being installed on the global war fronts and at training stations elsewhere. The photo shows one set up on a river bank—"somewhere in South America".

The rugged construction of RELIANCE equipment amply fits it for RUSH War work. The same equipment will soon be available, we hope, for construction at home.

Advise us what your plans for Post-War work will require. Tell us the type, size and amount of washing, screening, crushing and conveying equipment, which you are likely to need. Then we can prepare intelligently to help you meet Post-War demands, which may come suddenly. *Write to-day.*

UNIVERSAL ROAD MACHINERY CO.
Kingston, N. Y., U. S. A.
DISTRIBUTORS IN ALL PRINCIPAL CITIES OF U.S.A.

JACKS IN WARTIME INDUSTRY—**Duff-Norton Mfg. Co.,** Pittsburgh, Pa. (4-p. illustrated bulletin) Contains

condensed descriptions of various applications of jacks in industrial plants, mining, railroads and transportation, construction, aviation, and shipbuilding. Also describes company's data books and literature available to jack users. These include complete maintenance manual, which tells how to get best service from jacks; safety and maintenance posters, which are available in two types for railroad use or for use by industrial plants, mines, and shipyards; and handy data book on jacks, which covers company's complete line.

★ ★ ★

PIPE TOOLS—**Beaver Pipe Tools, Inc.,** Warren, Ohio (48 pp., illustrated) Covers extensive line of pipe threading and cutting tools, both hand-operated and power-driven. Among tools described and illustrated are plain and ratchet threaders, thin-wheel pipe cutters, portable power units equipped with pipe vises, pipe reamers, square-end sawing vises, semi-adjustable and fully adjustable threaders, including gear-driven models. Featured also is Model A high-speed, heavy-duty 1/8-2-in. portable pipe and bolt machine. There is wide range of threading equipment using monotype and duo-type dies. Small portable pipe machines may be used as electric drives to operate geared cutting and threading tools for pipe up to 12 in. dia.

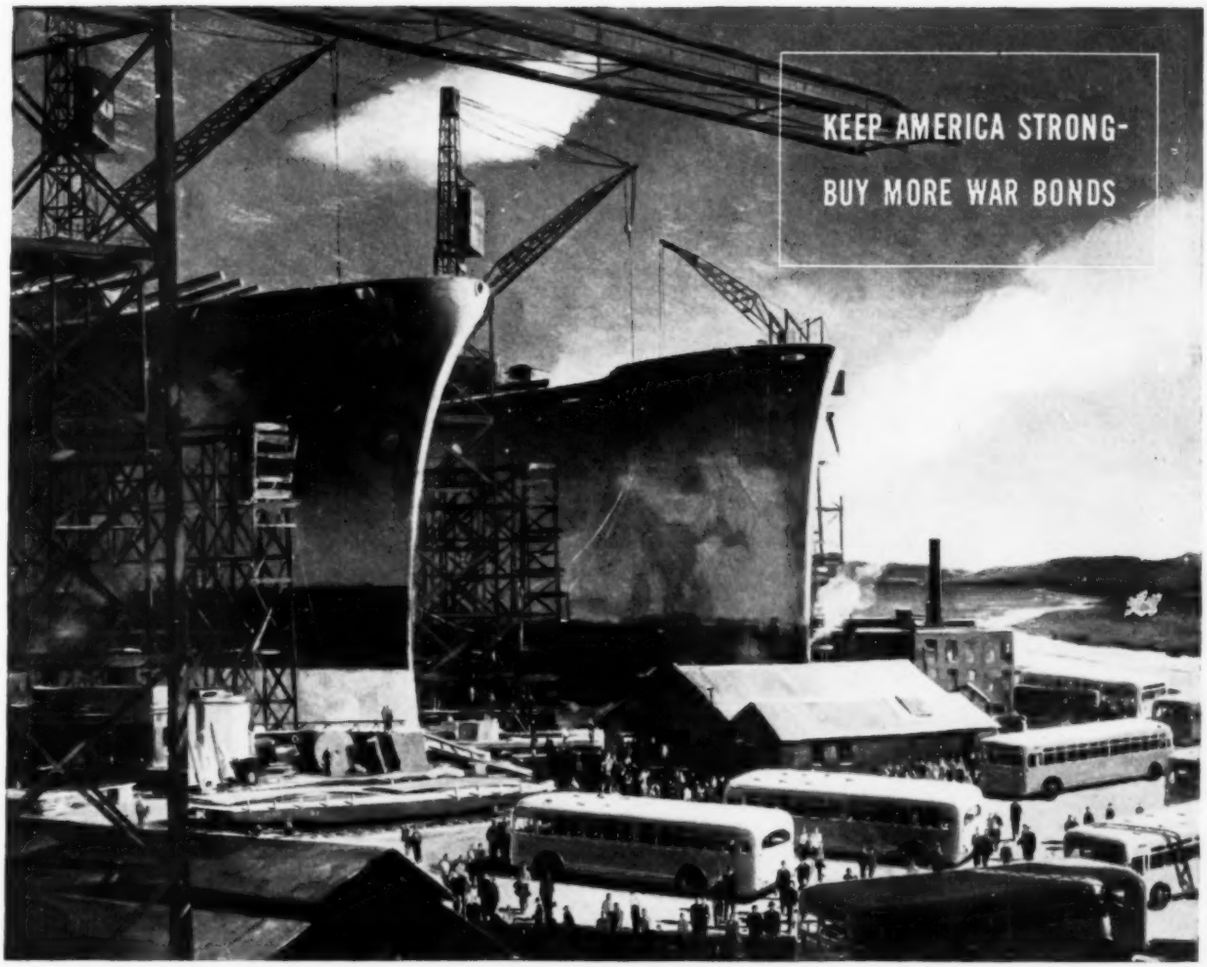
★ ★ ★

AIR COMPRESSORS—**Schramm, Inc.,** West Chester, Pa. (16 pp., illustrated) Describes compressor design features which include mechanical, cam-operated intake valve; larger discharge valve-in-head; force-feed lubrication to every moving part, through oil lines drilled in metal; main bearings for each cylinder; built-in electric self-starting standard on all engine models; safe, fast, easy starting; and weight reduction up to 40 percent. Illustrates units for skid mounting, steel wheel mounting, rubber tire wheel mounting, standard and deluxe two-wheel trailer mounting, and motor truck mounting. Also gives specifications for belt-driven units.

★ ★ ★

HEAVY-DUTY INDUSTRIAL MAINTENANCE PAINTS —**American-Marietta Co.,** 43 E. Ohio St., Chicago (11), Ill. (8-p. two-color catalog) Describes Valdura

line of paints. Provides application suggestions, product descriptions, and technical data in complete detail. Aids maintenance man or purchasing agent to plan his paint requirements and know characteristics of drying, coverage and application. Includes information on asphalt paint; machinery and floor enamel; metal lead; Singlekote, washable oil wall paint; Millwhite for interior painting; Dary-white enamel; and Asgum and Roofdura, roof coatings.



PEACETIME TRANSPORTATION ON A WAR JOB

One important peacetime use of Diesels got a good start well before the war—low-cost transportation. Long engine-life, long periods between overhauls, long mileage on inexpensive fuel, and steady stick-to-it operation add up to new economies in travel.

NEARLY every Diesel engine General Motors makes now goes to work for Uncle Sam.

Most of them go right into the fighting—into tanks, trucks and tractors, into combat ships, patrol boats and landing barges.

But here are GM Diesels doing a big wartime job in a home front application.

It's a Navy "task force" of some 250 General Motors Diesel coaches that carry thousands of Mare Island Navy Yard workers in California to and from the job every day over a fifty-mile radius.

These are doing the same day-in-day-out dependable job which thousands of GM Diesel-powered coaches were doing before.

And they point to the days ahead when General Motors can devote its expanded plants to providing bus operators with engines and parts improved and refined through their work at war.

GM
GENERAL MOTORS
DIESEL POWER

ENGINES..15 to 250 H.P... **DETROIT DIESEL ENGINE DIVISION**, Detroit, Mich.

ENGINES..150 to 2000 H.P..CLEVELAND DIESEL ENGINE DIVISION, Cleveland, Ohio

LOCOMOTIVES.....ELECTRO-MOTIVE DIVISION, La Grange, Ill.

Everything Under Control
• • • OF THE "BIG VOICE"
Commands and instructions over loud speakers direct the operations of landing forces and combat units. To operate these, and other communication systems, power is supplied by portable gasoline engine powered generators. One more combat duty added to the many standard and special applications powered by hundreds of thousands of dependable, instant-starting, 4-cycle, air-cooled Briggs & Stratton engines now serving our armed forces.
INQUIRIES are requested from those manufacturers who require portable gasoline engine power for war production — or for their post-war gasoline-powered equipment now being planned.
We are better prepared than ever to carry on the traditions of Briggs & Stratton engines — with the same high standards of quality and precision manufacture, their rugged dependability, easy starting and economical performance — all the features that have earned for Briggs & Stratton the reputation of "the world's finest air-cooled gasoline engines."
"It's powered right — when it's powered by Briggs & Stratton"
BRIGGS & STRATTON CORP.
MILWAUKEE 1, WIS., U. S. A.
BACK THE ATTACK
BUY WAR BONDS
4 CYCLE
BRIGGS & STRATTON
GASOLINE ENGINES

PUMP BULLETIN—**Peerless Pump Co.**, 301 W. Ave. 26, Los Angeles (31), Calif. (8-p. three-color bulletin) Describes improved methods of pumping water from deep wells. Two basic methods of raising water—by turbine and by hypocycloidal—are illustrated. Difference between oil and water lubrication is also shown. Interesting cross-sectional views of deep well pumps, revealing shafting and submerged elements demonstrate operation of lifting water from any depth. Various types of pump heads are included to illustrate application of power, for direct motor connection, belted drives, geared power and combinations of these.

★ ★ ★

LUBRICATION EQUIPMENT—**Gray Co., Inc.**, Minneapolis, Minn. (24 pp., illustrated) New Catalog (P-934) describes air-operated lubricant pumps of portable and stationary types, barrel pumps for 400 lb. drums, pressure chassis lubricator and line of Graco convoy lubers, self-contained units, designed for mounting on motor trucks, for heavy-duty servicing of equipment in field. Convoy lubers include air compressors, storage tanks, lubricant tanks and heaters, and reels carrying hose through which lubricant is applied under pressure to machine to be serviced. Also covers 25-lb. bucket pumps, hand-operated gear lubricant dispensers, power guns, fittings and accessories.

★ ★ ★

PIPE AND TUBE BENDING HANDBOOK—**Copper & Brass Research Assn.**, 420 Lexington Ave., New York (17), N. Y. (80 pp., illustrated.) New and comprehensive treatise illustrates and describes approved methods and equipment for bending pipes and tubes of copper and its alloys. Includes 35 pp. of unit weights of tubes of different alloys with varying diameters, wall thicknesses and shapes, as well as pertinent information on chemical and physical properties of such pipe material. Text covers subjects such as hot and cold bending, minimum radii, temper, use of mandrels of various types and many other essential factors. Bending with use of filler materials such as sand, rosin, salt and low melting temperature alloys are described and illustrated. Step-by-step procedures for both smooth and wrinkle bending of large-diameter pipe show methods and equipment in considerable detail.

★ ★ ★

CARE OF BUCKETS—**Hayward Co.**, 50 Church St., New York (7), N. Y. (Three 4-p. booklets) Contain timely information and helpful suggestions on proper care and maintenance of orange peel, clamshell and electric motor buckets. Emphasize importance of correct bucket lubrication at proper intervals, frequent inspection of wearing surfaces and parts, advantage of promptly replacing worn parts before they weaken or impair whole bucket structure, and greater operating efficiency obtained by keeping moving parts in proper adjustment.

Someday the Kid FROM THE ENGINEERS will Come Back

WHEN he does, he'll have a story to tell. Impossible construction jobs accomplished in record time and under enemy fire. Equipment operated under tougher conditions than any contractor ever dreamed of. Facts about repairs that were made and many that were never required. He'll know the true value of shovels and cranes and we'll wager he can confirm the statement so often made about Lorain equipment—

Lorains move more material, faster.

THE THEW SHOVEL COMPANY • LORAIN, OHIO

thew Lorain MOTO-CRANES

CRANES • SHOVELS • DRAGLINES

MERCER
"The Name that Carries Weight"
EQUIPMENT
for the
HANDLING
of
CONSTRUCTION
MATERIALS
Cranes, Elevators, Lift & Trailer Trucks,
Conveyors, Live Skids, Drum Hoists,
Winches, Tool Wagons, Carts.
WRITE FOR DETAILS
MERCER-ROBINSON COMPANY
INC.
30 CHURCH ST. • NEW YORK 7, N. Y.

Plywood and Lumber Replace Metal in Shipbuilding

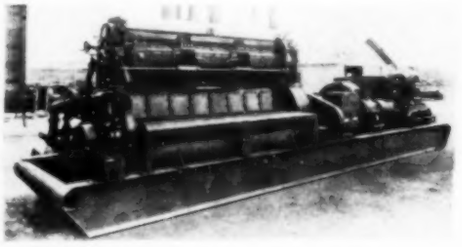
MAKING METAL AVAILABLE for urgent war products, 5,249,774,000 b. ft. of lumber and 456,808,600 sq. ft. of plywood have been used to replace 5,297,076 tons of metal. The largest items of replacement are in the construction of ships and boats, according to the National Lumber Manufacturers Association. Laucks, Inc., of Seattle, Wash., reports that a synthetic resin paint has been formulated especially for use on exterior-grade plywood which gives the appearance of monolithic concrete.

★ ★ ★

Portable Power Unit Supplies Oil Pumping Service

CONVERSION AND ADAPTATION of a modern, gas-fueled, stationary type engine, to a portable diesel power unit complete for field service, was recently reported to the Cooper-Bessemer Corp., heavy engine builders of Mount Vernon, Ohio and Grove City, Pa., whose prime movers are practically all designed for conversion from gas to diesel, or diesel to gas operation.

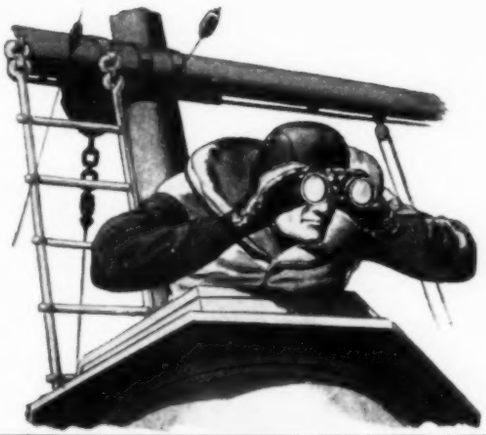
The idea was worked out by engineers of a major pipe line company of Tulsa, Okla. This large portable diesel unit answers a critical need by supplying convenient temporary pumping service for



OPERATING SIDE of the 8 cylinder, Cooper-Bessemer diesel engine, converted for portable field pumping use by changing from gas fuel to oil and adding skids for a base.

transporting crude oil through the trunk line quickly to provide an increase from 30,000 to 40,000 bbl. per day, and can also be used for transporting crude oil from new wells through temporary feed-

(Continued on page 126)



The Navy knows the Answers

In our Navy, the world's most formidable fighting machine, Diesel-powered craft of all kinds are lubricated with Standard of California's RPM DELO. The answers in this naval quiz tell you why. They'll solve your problems on how to squeeze more efficiency out of your Diesels—and cut maintenance costs.

Q. Can a submarine drown in air?

A. Yes. Her Diesels "breathe in" great quantities of air which cause ordinary oils to turn gummy, stick rings and hasten engine failure. In today's subs, RPM DELO eliminates this ring-sticking, reduces sludge and deposits—greatly increases cruising range.

Q. How do you put a bone in the teeth of a DE?

A. Powerful Diesels put that speed wave under the bow of a Destroyer Escort. With RPM DELO lubricating her big engines and keeping them at top efficiency, a Destroyer Escort can sprint like a racehorse, even at the end of a long convoy trip.

Q. What is the most explosive part of a minesweeper?

A. Her engine. Thousands of times a minute, fierce explosions sear her cylinders. But they're safe with RPM DELO because it contains special additives that make it cling to hot spots, give constant point-of-wear protection, even under most severe conditions.

Q. What is the most important duty of a landing barge?

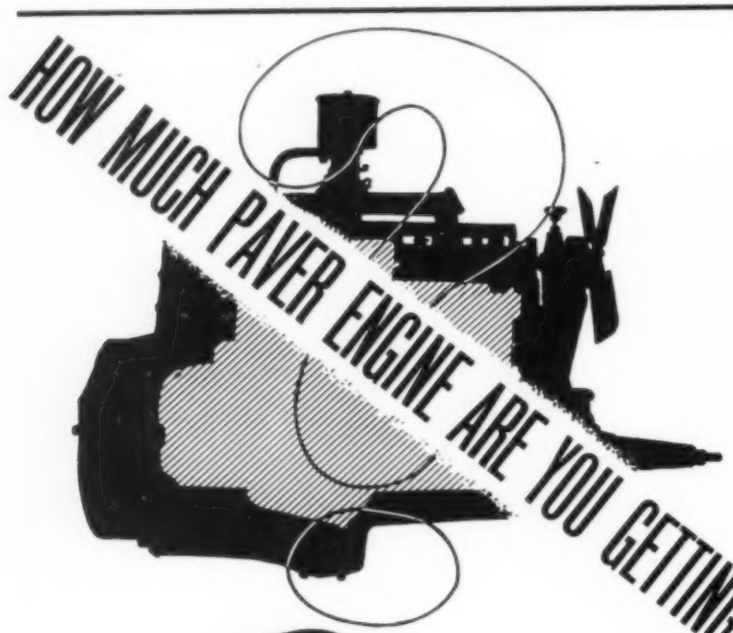
A. To keep in action—because a beachhead breakdown could be disastrous. RPM DELO in a landing boat's Diesel gives it extra protection against breakd-wns. RPM DELO often cuts Diesel repair bills in half, doubles the time between overhauls, minimizes wear.

RPM DELO
DIESEL ENGINE LUBRICATING OIL

RPM DELO is marketed under the following names: **RPM DELO • Caltex RPM DELO**
Kyso RPM DELO • Signal RPM DELO • Imperial-RPM DELO CONCENTRATE **• Sohio RPM DELO**

STANDARD OIL COMPANY OF CALIFORNIA

Ask your Diesel engine manufacturer or distributor for the RPM DELO supplier in your vicinity



Ransome

34-E DUAL DRUM PAVERS

Give You *Slow-Speed* Conservatively-Rated Power

Whether your Ransome Paver is powered by a diesel or gasoline engine, you get a large husky power plant which runs at *slow speed.*

Ransome's use of an over-size engine assures longer life, lower maintenance expense, reduced fuel consumption and, above all, less time off the job for adjustment and repair. Owners report that after a season's running, removing carbon and grinding valves puts their engine back into top condition. If a high-speed smaller-displacement engine were used, more extensive repairs would undoubtedly be necessary.

When purchasing your next paver, check the engine displacement and operating speeds of all makes. It will be worth your effort.

Write for

RANSOME

Literature

RANSOME MACHINERY COMPANY

Subsidiary of the WORTHINGTON PUMP AND MACHINERY CORPORATION

DUNELLEN **NEW JERSEY**

(Continued from page 124)

er lines to main trunk lines, thus replacing several engines of less capacity. It can also be used as a temporary unit in the event of failure of a trunk line unit.

The complete, heavy-duty gas unit, one of six Cooper-Bessemer Type EN, 8-ylinder stationary gas engines previously nstalled at a pumping station, was quickly converted to oil fuel operation. Mounted on a base of 18-in. I-beams, complete with all auxiliary equipment, it can be quickly transported to new field locations and placed immediately in service. The effectiveness of this field service idea can be judged by the simple hook-up necessary to put the converted unit into operation. Once it is placed in the desired position, the procedure consists merely of making the crude oil intake and discharge connections. Then the unit is ready to handle at least 700 bbl. of crude per hour at 700-lb. pressure.

How Change Was Made

In making the change, the gear increaser originally used with the gas unit was retained and a new pump was installed. Starting equipment is of the compressed-air-type driven by the small engine mounted at the front operating side of the diesel, with tank for air storage located under the operator's platform. A direct current generator furnishes power for lighting.

The heat exchanger, mounted along the length of the base skid is connected from the discharge of the crude oil pump, to the crude oil feeder line, the oil acting as the cooling medium for the exchanger cooling the jacket water.

★ ★ ★

Synthetic Rubber Adapted to Many Industrial Products

CONVERSION OF A MAJOR PORTION of its line of industrial rubber goods to synthetic rubber is announced by the Goodyear Tire & Rubber Co., following more than a year's research and development. Products to which synthetic rubber has been adapted include transmission, conveyor and elevator belts, hose V-belts, rolls of all kinds, molded products, and similar materials. In many cases, synthetic rubber has proved superior to natural, particularly for products where resistance to oil, acids, detergents, and similar materials is desirable. Synthetic rubber for mechanical rubber goods also withstands wider temperature ranges.

When you want to move earth fast . . .

PLAN TO USE TOURNAPULLS

Tournapulls Combine Speed of Truck with Pull of Tractor, Get Earthmoving Jobs Done Quickly Despite Adverse Operating Conditions

War projects the world over . . . in the Aleutians, England, Tunisia, Australia—almost everywhere . . . show that Tournapulls can go places and move dirt under conditions once thought impossible for wheeled equipment. Take this example from the Canol project:

Break Trail at 55° Below

Last winter six Tournapulls set out on the 800 mile trip from Ft. Smith, Alberta, to Canol, Northwest Territories, over some "of the toughest, roughest, muddiest, coldest and snowiest country" in the world. Fuel was carried in the Scraper bowls. Only road was a trail a Dozer had been over once. Temperatures dopped as low as 55° below. Hard-packed snowdrifts 4 to 5 feet deep along the last 400 miles stalled accompanying trucks, but not the Tournapulls. They bucked a trail through. It took 15 days to go those last 400 miles—that's how tough the drifts were—and only 6 days for the first 400 miles.

Despite the rough trip, low temperatures and drifts, the Tournapulls went right to work on arrival, building roads and finishing an airport for the Canol project.

1200 Job-Prove Ability

Recently the 1200th Tournapull rolled off our assembly line on its way to the Army. Ability to deliver profitably and with sureness, proved at Canol and on hundreds of other difficult projects, has made Tournapulls a big favorite with alert contractors and hardboiled Army engineers. When planning for the future, figure to profit by using fast-moving Tournapulls on your jobs. Your LeTourneau-"Caterpillar" dealer will gladly give you facts and figures. See him NOW for Tournapull dope.

(Above) Tournapull heading north on the Alcan Highway. Fifteen to twenty of these rigs worked here and on the Canol Project. They reduce time between jobs by traveling overland on their own power, then reduce job time because they move more dirt faster.

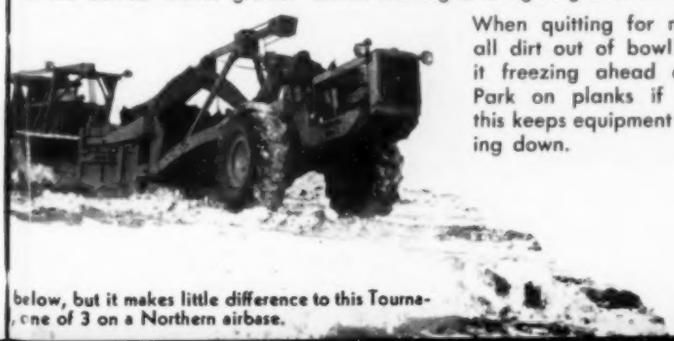
Winter Hints for Operators

You'll have less trouble and get more work from Tournapulls and tractors in winter if you—

Use a good grade of anti-freeze in your radiator and check it often.

Change crankcase, transmission, final drive case and Power Control Unit oil to the correct winter grade. Check starting and lighting batteries frequently.

When quitting for night, clean all dirt out of bowl to prevent it freezing ahead of tailgate. Park on planks if available—this keeps equipment from freezing down.



below, but it makes little difference to this Tourna- one of 3 on a Northern airbase.

LE TOURNEAU

Peoria, Illinois • Stockton, California

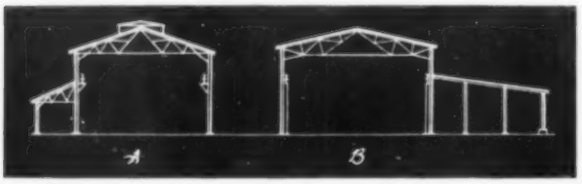
LeTOURNEAU (Aust.) Pty, Ltd., Rydalmere, New South Wales, Australia

Manufacturers of DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNAROPE*, TOURNA-TRAILERS*, TOURNAWELD*, TOURNACRANES*.

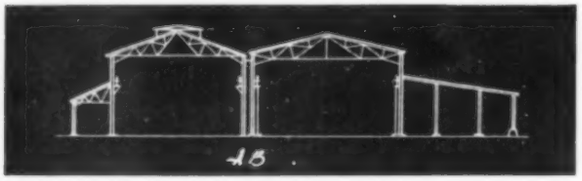
* Trade Mark Reg. U.S. Pat. Off.

New steel saved when Bethlehem constructed six buildings in two shipyards from old steel acquired by dismantling several scattered idle buildings.

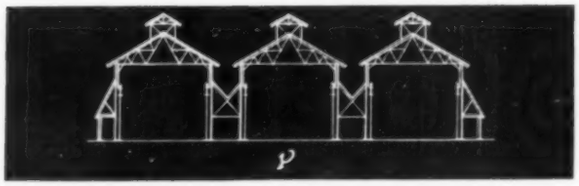
Two East Coast shipyards urgently needed a number of buildings to handle their mushrooming ship production. Bethlehem's Fabricated Steel Construction Division was assigned to provide the structures. To conserve steel and to save time in getting the buildings started, the original plans were changed to call for wood construction. But when it was found that even the required quantity of wood was not readily available, Bethlehem engineers worked out a way to build the structures of steel salvaged from various old buildings scattered about the country. In detail, this is what was done:



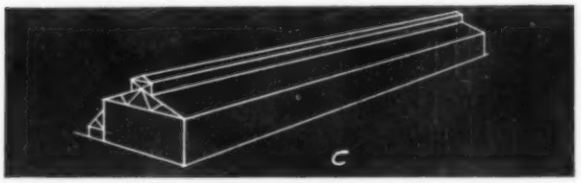
A is a kiln building, 392 ft. by 80 ft., from a brick yard at Haverstraw, N. Y. B is a building, 120 ft. by 306 ft., formerly used for housing marble saws and other machinery at a quarry at Knoxville, Tenn. Both of these unused structures were dismantled and reerected side by side at Shipyard X, A as a plate shop and B, as a mold loft and fabrication shop, as below.

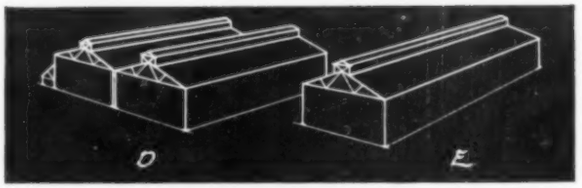


Then, for Shipyard Y, a kiln building, 192 ft. by 166 ft., at Catskill, N. Y., was taken down and reerected as a warehouse. The kiln building, as purchased and substantially as reerected, is shown below.



Also for this shipyard, a kiln shed C, 80 ft. wide by 1020 ft. long, at Beacon, N. Y., yielded 500 tons of steel, which was reerected into two buildings, D, a pipe and copper shop, and E, a sheet-metal shop.





Still another building F, at Beacon, N. Y., at one time used for clay storage, provided the steel for building a boiler house and compressor house, G.

Besides salvaging the structural steel from these old buildings, Bethlehem also saved virtually all the roofing, siding, and window sash and reused it so that very little new roofing or siding had to be obtained. In this way an over-all total of 1233 tons of old, idle steel was acquired and used—enough to erect the shipyard buildings without having to draw heavily upon the much-needed output of critical new steel.

BUY MORE WAR BONDS

★ ★ ★ BETHLEHEM STEEL ★ ★ ★

Bureau of Reclamation Sells Shasta Dam Power

CONTRACT FOR THE SALE of the first block of power from Shasta Dam of the Bureau of Reclamation's Central Valley Project has been executed by the Secretary of the Interior to the Pacific Gas & Electric Co. A minimum annual payment by the company of $2,775,000 beginning in 1945 is guaranteed. Under the agreement the United States will transmit power to the company over a 97-mi. transmission line which the Bureau of Reclamation is building from the dam to Oroville, Calif. It will deliver the energy to the P.G. & E. at the Shasta substation, 25 mi. from the dam, and will lease temporarily to the company, for a monthly rental charge of $6,250, the portion of the line extending from this substation to Oroville. The Shasta Dam power plant is scheduled to begin operating in March, 1944, with an installation of 150,000 kw.

Shasta Dam on the Sacramento River is now nearing completion and the first two 75,000 kw. generators in the power plant are being installed. The full capacity of the machines may not be available for the company until about January 1, 1945, because of the necessity of completing the storage of water in the Shasta reservoir.

★ ★ ★

TVA Reports Decline in Accidents

CONTINUED DECLINE in accidents on TVA construction and other operation was reported on the basis of figures for the first six months of 1943. The accident frequency rate for June was 8.7 injuries per million man-hours of work, nearly 30 percent lower than for June, 1942. The rate for the first six months of this year was more than 24 percent lower than that for the calendar year 1942. Although a fatality at Fontana Dam raised the severity rate materially, the 1.21 days lost per 1,000 man-hours of exposure in June still represented a nearly 64 percent drop from June, 1942, while the rate for the first six months of 1943 was nearly 37 percent lower than for 1942. TVA accident frequency and severity rates have declined steadily, even during the height of construction operations when 12 dams and a steam plant were under way simultaneously.

AN IDEA PER DAY THE *Porto-Power* WAY!

WILL SAVE 75 MAN HOURS PER JC
CLAMPING FOR WELDING (B) AND (C) TOGETHER
20
LIFTING A CRANE OFF ITS TRACK TO INSTALL NEW AXLE SHAFT
40-TON PORTO-POWER USED WITH STANDARD CHAIN PULL-PLATE AND CRIBBING
SAVING OF TIME OVER OTHER METHODS — ABOUT 3 HOURS
21
PUSHING SHAFT INTO CAST IRON GEAR
GAUGE SHOWS PRESSURE
PORTO-POWER IN SHOP MADE PRESS NEEDLESS DAMAGING, HAMMERING, RIVETING OR EXCESSIVE USE OF HEAT OR UNCONTROLLED FORCE
PREVENTS DAMAGE TO MATERIALS DURING ASSEMBLY OR DISASSEMBLY
22
HOW TO SPEED UP PLACING RE-INFORCEMENTS IN CONSTRUCTING BILGE SECTION
ELIMINATES:
SAVES 50% IN TIME — CUTS OUT MATERIAL FOR WEDGES AND BLOCKING
HOW TO PULL GEAR ON ASSEMBLY A L H AXLE

Every construction job has its own special problems — and every day ingenious new ways of using Porto-Power are being worked out to save time and manpower on those tough jobs. That's in addition to all kinds of "straight" bend, press, push, pull, lift and clamp jobs done faster, better and easier the Blackhawk Porto-Power Way. The range of Porto-Power uses is limited only by the ingenuity of the operator. Porto-Power is the greatest all-around "working tool" yet developed to fit the keep-'em-coming speed of wartime construction.

A Product of
BLACKHAWK MFG. CO.
Dept. J23123 • Milwaukee, Wis.

EXCLUSIVE COMBINATION OF FEATURES makes "Porto-Power" the most versatile hydraulic jacking device available to shipyards today! Saves time and materials — releases manpower for other work.

ALL-DIRECTIONAL RAM — used alone or with standard attachments or your own special fixtures.

HAND-OPERATED PUMP — works anywhere. No electrical or air hook-ups.

HIGH-PRESSURE HOSE permits operator to stand safely at a distance to sight the job. Gets ram in close quarters.

HERE'S A TOUGH ONE! A close-fitting pin must be removed from a rudder assembly — and there's hardly working room for a man's hand, no chance for sledges, etc. But the Kaiser Swan Island Shipyards call in one of their "Porto-Power" hydraulic rams (this one only 4 1-2 inch long, delivers 7 tons of power) and the pin is eased out quickly.

You need this new catalog showing Blackhawk Hydraulic Equipment available NOW. Get it from your Blackhawk Distributor — or write us.

BLACKHAWK MFG. CO.
Dept. J23123, Milwaukee, Wisconsin
Please rush to us at once — New Catalog on Porto-Power and other Blackhawk Wartime Equipment.

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Company.....
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City.....State.....

BLACKHAWK
HYDRAULIC EQUIPMENT

A BEAR FOR FAST LOADING

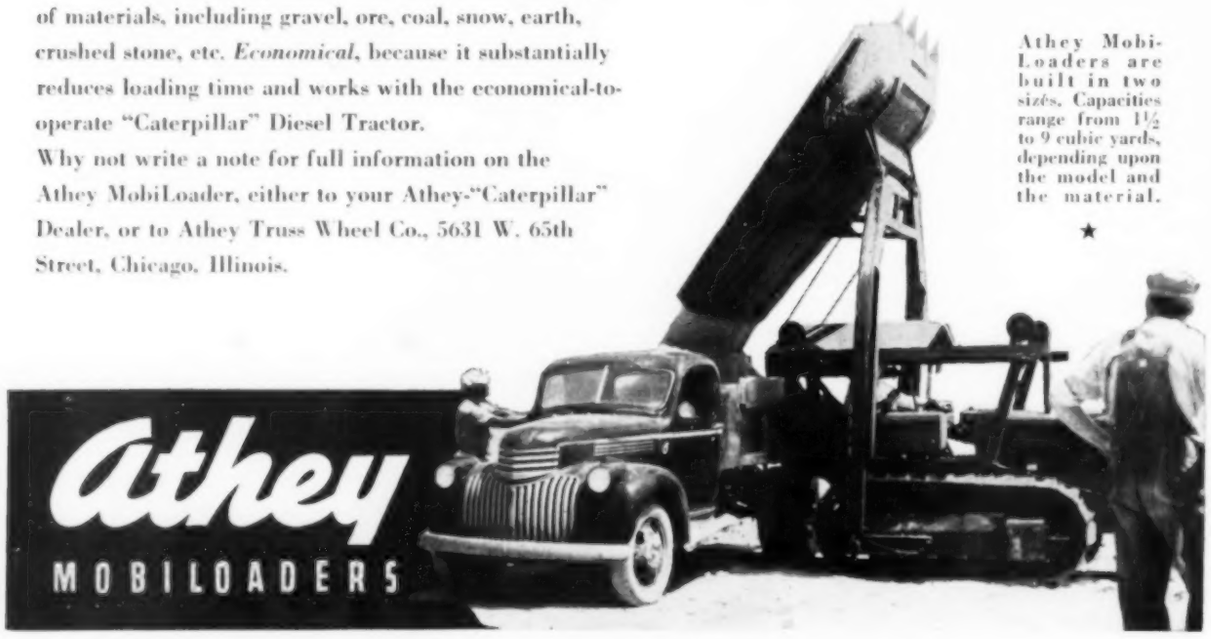
Loading Bauxite ore for Bauxite Co. of Alabama with Athey W 4-1 MobiLoader. 4-yard trucks are loaded in less than 2 minutes this fast, simple way.

The closing year goes down in history as a year for speed in construction. In jumping ahead of the Axis nations on every score, fast production was essential. A time-saving tool that gained scores of new friends on the military and home front is the Athey MobiLoader. It's *fast*, because it's an overhead loader that digs and hauls bigger loads with no waste motions. It goes forward into a stockpile, with bucket down to dig its load, and travels directly back in reverse, discharging the material into the truck or fill. *Versatile*, because it can load a wide range of materials, including gravel, ore, coal, snow, earth, crushed stone, etc. *Economical*, because it substantially reduces loading time and works with the economical-to-operate "Caterpillar" Diesel Tractor.

Why not write a note for full information on the Athey MobiLoader, either to your Athey-"Caterpillar" Dealer, or to Athey Truss Wheel Co., 5631 W. 65th Street, Chicago, Illinois.

Athey MobiLoaders are built in two sizes. Capacities range from 1½ to 9 cubic yards, depending upon the model and the material.

★



RING-FREE REMOVES CARBON REDUCES FRICTION, SAVES FUEL!

Don't Deprive *Any* Power Plant Of This Operating Economy!

Carbon trouble is expensive in down-time and repair bills on all sizes and types of Diesel and Gasoline engines. In every engine suffering from carbon, the first crankcase full of Macmillan RING-FREE Motor Oil begins to *remove* the carbon from pistons, rings, valves *while the engine runs.* Continued use of RING-FREE keeps the formation of destructive carbon in check. The result is a cleaner, more thoroughly lubricated, sweeter running engine.

Another, even greater RING-FREE advantage is its ability to reduce friction *fast!* That actually delivers more power to the drive shaft . . . produces measurable fuel savings. It also cuts down wear and repair. Many operators who started by lubricating just one of their engines with RING-FREE were so convinced by the performance and economy obtained that they now order Macmillan RING-FREE for *all* their motorized equipment.

MACMILLAN PETROLEUM CORPORATION

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REDUCES WEAR BY REDUCING FRICTION

Speed-up

.. for bigger yardage and lower costs

...with Heil Hi-Speed Cable Scoops

These big 15-yard tractor scoops are push-loaded in 40 to 50 seconds. They haul at travel speeds up to 20 miles per hour. And that's speed in any language! ... Tilting floor gives positive mechanical pushout from the bowl, spreads loads evenly. The matched tractor-scraper unit accelerates fast — steers without effort, by hydraulic power — turns on a dime — stops safely where you want it, with individual and unit-controlled air brakes. Fast, positive Heil Cable Control of the scoop ... It's an operator's dream — and its extra speed on long hauls often represents the difference between a profit and a loss for you. With this modern equipment, you're the fellow with a reputation for "cutting the mustard". Get in early on post-war waiting list. Write for bulletins.

R-18

ARMY E NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WIS.

Compressor Auxiliaries

Needed to Insure Efficient Operation

WHILE THE COMPRESSOR is the prime unit in any compressed air plant, there are certain auxiliaries, the Compressed Air Institute points out, which are vitally important, if not necessary, if the plant is to produce overall maximum results. Practically every compressor requires an air receiver of ample size; in addition, most compressed air plants should use aftercoolers. An approved and efficient air filter should always be installed in the suction, and in addition to this, a great many protective instruments in the way of gages, thermometers, relief valves, and suitable drains should be installed when necessary.

Air Receivers

In every compressor installation, the air receiver forms an essential part. It not only absorbs pulsations in the discharge of the compressor, but also acts as a reservoir for the storage of compressed air, furnishing some reserve capacity to compensate for instantaneous demands in excess of the compressor capacity. It also acts as a condenser for some of the moisture present in the air or gas as it comes from the compressor, and to collect and keep from entering the distribution system, such condensation as may pass the aftercooler. Receivers are also necessary to supply uniform pressure for governing instruments. If governors are connected to the discharge line, the pulsations therein will result in unstable operation.

Obviously, the proper functioning of this accessory is essential to the overall efficiency of the compressor assembly, and any weakness will be revealed in faulty operation of the compressed air plant.

The Compressed Air Institute endorses only air receivers that meet the requirements of the A.S.M.E. code, and has standardized on a line of such receivers, in sizes and capacities up to 428 cu. ft. for discharge pressure up to 125 lb. p.s.i. Relief valves must not be set higher than the pressure stamped on the tank.

Aftercoolers are advisable, if not absolutely necessary, in nearly every air compressor installation as a means of removing water and oil vapors by means of

condensation. Compressed air or gas contains moisture in some degree, dependent upon the condition of the air taken into the compressor. As the air is compressed, it does not condense its moisture because of the rise in temperature that accompanies compression, and thus it is carried along as a vapor through the receiver and into the pipeline. The temperature of the compressed air falls rapidly in the discharge line due to radiation, resulting in much water being condensed in the line. Aside from being objectionable in the line this water is very destructive to pneumatic tools or other mechanical equipment in which the air is used.

It is to force this precipitation by lowering the temperature of the air before it enters the discharge line that aftercoolers are employed. They are installed near the compressor to condense the moisture before it has a chance to enter the line, and should be installed with an automatic trap to dispose of the condensation as it occurs.

Aftercoolers are of the shell and tube type and of course depend for satisfactory performance upon the use of the coldest water available. Obviously, unless the aftercooler is of liberal size, cooling will be incomplete, which means that the maximum amount of water will not be removed from the air.

If 1,000 cu. ft. of saturated air is drawn into a compressor at atmospheric pressure and at a temperature of 70 deg. F., it will contain 1.12 lb. of moisture. This moisture will, somewhere along the line, condense, and the water will pass into any mechanical equipment for which the air is used, causing very rapid wear of these parts.

Air Filters and Silencers

The air compressor inlet must be provided with air filters to prevent dust and grit from passing into the compressor, where it causes rapid wear of the working parts, as well as combining with the lubricating oil as a binder and forming obstructive and abrasive coating on cylinder and valves. The carbon sometimes found on valves and discharge pipe will be found upon analysis to be mostly dirt, with some oil, which can cause leakage by getting under the compressor valves. Such gritty deposit will also add to the rapid wear of moving parts.

When the noise of the suction is objectionable due to the location of the compressor, an air silencer should be used. Several makes of satisfactory silencers are now available and recommendations can be obtained from the compressor manufacturer. The silencer

(Continued on page 134)

. . . or if it's a Bottom-Dump Trailer Wagon you need . . . this new Heil Unit breaks all the speed records

High-clearance doors operate on clamshell principle...

35 inches clearance—with doors wide open — is really something! There are no doors dragging in the dirt — nothing to slow up the unit. The operator turns off the windrow at sharp angles wherever he chooses . . . Dumping is under fingertip control . . . all in one heap, or with an even spread that looks almost like the work of a cable scraper. Doors are *power-opened* — in 2 seconds — under cable control (they *close* by gravity) . . . If you want to see a big smile on your operator's face give him this new equipment to work on . . . watch him dump and get away in a flash . . . then do a little figuring on what this means to you in dollars and cents and a reputation for clean-looking, on-time completions. Get yourself a *post-war "priority"* by ordering now.

Write for bulletins.

Note: Tractor unit can be ordered to operate interchangeably with cable scraper on facing page. R-17

Heil
Earth Moving Machinery
Trailbuilders • Bulldozers • Cable Scrapers • Sheepsfoot Tamping Rollers • Hi-speed Wheel Tractor with Semi-trailer Scraper or Semi-trailer Bottom Dump Wagon.

ARMY NAVY

THE HEIL CO.

GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

Do you know your regular SKILSAW will do grooving *in a single operation?* Just replace the regular blade with this GROOVING BLADE (illustrated at left) and you're ready at once to groove for stairs, shelves, and weather stripping . . . to slot floors for sliding doors . . . to speed up rabbeting, mortising and many other jobs.

It's wise right now to learn about *all* the different jobs you can do with SKILSAW. That's how you'll learn to cut costs on more operations . . . to save more time . . . to get yourself bigger, more profitable contracts in the days to come. Ask your distributor for a demonstration NOW!

SKILSAW PORTABLE ELECTRIC TOOLS

★ MAKE AMERICA'S HANDS MORE PRODUCTIVE ★

SKILSAW, INC.
5045 Elston Ave., Chicago 30, Ill.

Sales and Service Branches in All Principal Cities

With this GROOVING BLADE . . . SKILSAW speeds all grooving, rabbeting, mortising.

(Continued from page 133)

also should not offer excessive resistance to the flow of air.

Discharge silencers are also available when excessive noise is experienced on the discharge, frequently called "tank ring", resulting from discharge pulsations impinging against the air receiver.

Protective Devices

Many protective devices should be installed in every compressed air system. If a shut-off valve is installed in the discharge line, a relief valve must be placed on the compressor side of the valve to protect the machine in case the operator starts the unit before opening the valve. Part of the standard equipment of air receivers is a relief valve, but that will not protect the compressor if a shut-off valve is located between the receiver and compressor.

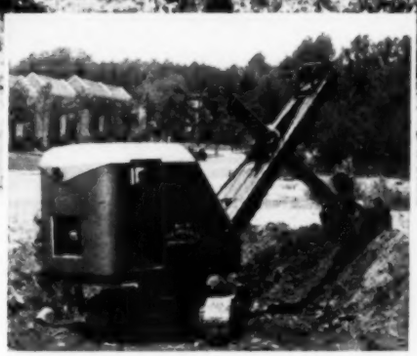
Installation of Drains

Drains of ample size should be installed, wherever needed. Intercoolers and aftercoolers condense considerable moisture that is carried in the air. This condensate must be carried away and not allowed to pass through the next compressor cylinder. It is good practice to make these drains automatic so that their satisfactory functioning is not dependent upon attention by the operator, but care must be exercised to insure that the automatic trap works, which is not always the case.

Shutdowns Are Desirable

In many cases, especially on the larger steam and gas engine driven compressor equipment, an overspeed shut-down is desirable; such machines usually have limiting speed governors as standard equipment, whose purpose is to limit the speed of the machines. However, in case these governors should stick for any reason when the machine tries to overspeed, a device can be installed that will function to shut down the compressor. This device, if not standard equipment on the machine, can be obtained at a small extra cost.

For larger equipment, a lube oil failure shut-down is also desirable, since on the larger machines oil failure would result in a considerable repair charge. Jacket water failure shut-down is a protection for the machine in case the operator fails to turn on the cooling water or in case the cooling water supply should fail for any reason.



This Osgood "20" . . .

. . . is clawing a military road out of the stubborn, tangled New Guinea jungle. Other Osgoods are at work every day in every war theater — "dishing it out" and "taking it" — in rock, hard clay, mud, snow and sand. And no job is too tough!

All this world-wide, campaign-proved performance hastens the day when Osgood ruggedness, power, maneuverability (Osgood measured air control) and complete dependability can again go to work for you. With that in mind, why not check with Osgood regarding your post-war requirements!

Keep your equipment rolling with preventive maintenance

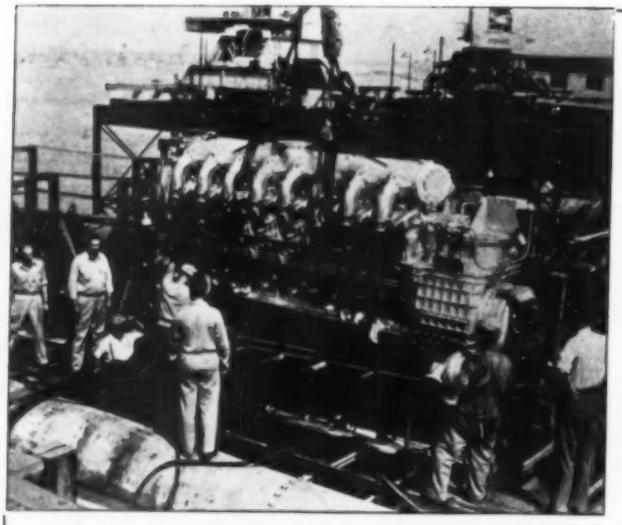
★

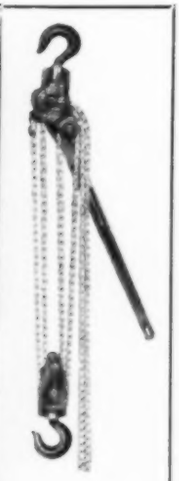
Keep the attack rolling with more War Bonds

The GENERAL EXCAVATOR CO.
Sizes: 3/8 - 1/2 - 5/8 - 3/4
DIESEL - GAS - ELECTRIC
Associated with THE OSGOOD CO.

The HERCULES COMPANY
HERCULES *IRONEROLLERS*
6 to 12 Tons
Diesel or Gasoline
Associated with THE OSGOOD CO.

OSGOOD
Sizes: 1/2 to 2 1/2 Cu. Yd.
Diesel - Oil - Gas - Electric
SHOVELS
DRAGLINES - CRANES
Crawler & Wheel Mounted
THE OSGOOD COMPANY, Marion, Ohio





SMALL TOOLS for BIG JOBS

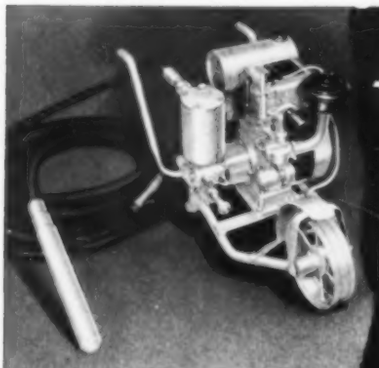
THAT'S THE WHOLE STORY ABOUT

COFFING SAFETY PULL HOISTS

Construction and Maintenance men say they use "Safety-Pulls" for 101 odd jobs. Wherever a lift or pull is needed the "Safety-Pull" will do the job safely, quickly and economically. Capacities from ¾ to 15 tons, yet these light weight, powerful tools weigh only 14 to 150 lbs. *Write for Catalog No. DG-6.*

COFFING HOIST COMPANY

800 WATER STREET DANVILLE, ILL.



Alert Contractors!

Buy the

JACKSON

Hydraulic Concrete Vibrator

for Dependable, Speedy Performance

- Automatic pressure lubrication—requires no attention.
- 34-ft. hose—2¾" vibrator head.
- Adjustable frequency to 6800 R.P.M.—submerged in concrete.
- Powerful gas engine—4.7 H.P.
- Long-lived, ball-bearing, rotary, hydraulic pump.

THEY CAN "TAKE IT" 24 HOURS A DAY 7 DAYS A WEEK

ELECTRIC TAMPER & EQUIPMENT CO.

LUDINGTON, MICHIGAN

Don't Abuse Concrete Vibrators

FOR THE BENEFIT of its concrete foreman on the Shasta Dam project in California, Pacific Constructors, Inc., makes the following suggestions to insure proper handling of concrete vibrators:

"Ever so often, for some unknown reason, men using electric vibrators forget that it is necessary to handle this valuable tool with respect. Serious consequences can result from negligence in their handling. The increasing number of vibrators being repaired indicates that the men mishandling them do not realize the seriousness of their carelessness. A large percentage of the repairs now is on the cord connection to the vibrator. The condition of some of them show that the vibrator cord is being used as a handle to pull the vibrator out of the mud or in raising or lowering it. There is no good reason why this should occur. Every foreman on the job should know that if he wilfully lets any of his men—old or new—mishandle a vibrator or use one that common sense tells him is unsafe, that man is taking a chance on another man's life. Give it some thought, foremen. It is your responsibility."

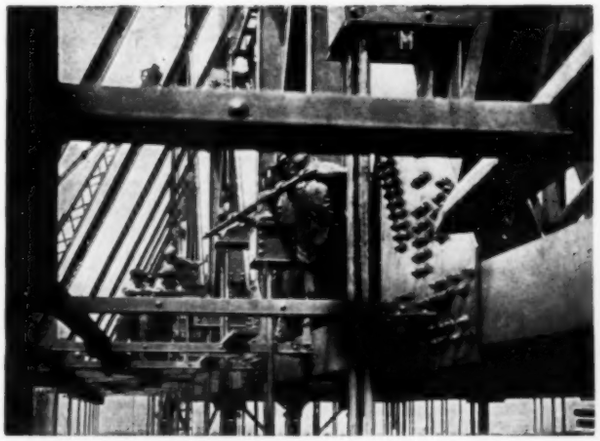
★ ★ ★

GUIDE TO USE OF CRITICAL MATERIALS PUBLISHED BY WPB

DESIGNED TO ASSIST engineers and architects responsible for planning proposed projects, a revised version of the "Critical Construction Materials Design Guide" has been prepared by the War Production Board Conservation Division. Applicants for authority to begin construction, pursuant to Order L-41, must be guided by this book, as well as by the "Directive for Wartime Construction." Work of processing the applications will be greatly reduced and action expedited if the builder maintains in the selection of materials the policies as stated in the guide, which outlines the items of construction that are permitted by WPB for projects approved as essential to the war effort.

Excepted from the scope of projects to which the guide applies are the following

(Continued on page 138)



LOWELL VETERANS Still in War Service

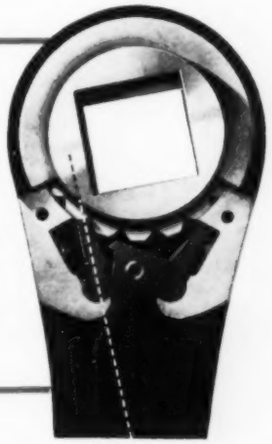
In this War as in the last ★ ★ ★

Many a LOWELL that served in the last war is still in war service today. New as well as veteran LOWELLS are busy on War construction. The thing to remember for *now* — and for after the War — is the fact that *a LOWELL Wrench lasts for years.* Every LOWELL is a husky, simple tool that speeds work, saves effort, gets the job done *right.* If your dealer can't supply you quickly today, you know the reason why.

LOWELL Reversible Ratchet Wrenches are made in a wide variety of types and sizes, both hex and square, suited to many kinds of heavy construction, erecting and maintenance work.

Straight line LEVERAGE . .

See how each pawl, when engaged, transmits leverage from the solid stock of the handle, direct to the gear in a *straight line* and with a square contact. The pawl is in compression only —no shear, no tension, no torsion. The shipper carries none of the load. This strong construction insures steady service.



LOWELL WRENCH COMPANY

1869 WORCESTER, MASS., U.S.A. 1943

. . . always noted for

Distinguished Service

No medals have been handed out for distinguished pumping service, but CARVER *Certified* PUMPS are being "decorated" daily with the highest award there is in the construction equipment field—*repeat orders.*

These continued repeat orders from the men who have judged and compared CARVER performance under every condition is convincing proof that CARVERS *do* deliver "distinguished" service—steady, low-cost pumping with less downtime from pump trouble. If you haven't the facts about CARVER pumps, see your distributor NOW!

Carver Pump Co., Muscatine, Iowa

(Continued from page 136)

classifications: Housing projects, which are governed by the War Housing Critical List; command construction projects, which are certain military projects ordered by the Chief of Staff, U. S. Army, or by the Chief of Naval Operations, U. S. Navy; and construction projects for which the Army, Navy, and Maritime Commission are the claimant agencies under the Controlled Materials Plan. Both of the latter types of construction are governed by the Army and Navy Munitions Board "List of Prohibited Items for Construction Work."

Copies of the guide are available from the Regional or District Offices of the WPB or from the WPB Conservation Division, 1100 H St., N. W., Washington 1, D. C.

★ ★ ★

Inter-American Highway

Traveled at Average Speed of 14 M.P.H.

TRAVELING 1,000 MILES in 6 days, a group of United States engineers and transportation specialists recently went by motor from Ayutla, Guatemala, on the Mexican border, to San Jose, Costa Rica. Accelerated construction on the Inter-American Highway made possible this trip at an average speed of about 14 m.p.h.

Work on the "pioneer" road to hasten completion of an overland route to the Panama Canal has been rushed in the last few months with technical and financial aid from the United States. In charge of construction is Col. Edward C. Kelton, U. S. Army Engineers. More than 20,000 men are working on the route through the Central American countries, using ancient and modern tools, ox-carts and trucks, picks and shovels, wheelbarrows and carryalls, hand drills and sledges, and the most modern air compressors and wagon drills. Road building in Guatemala is largely a hand labor job, augmented by use of modern U. S.-made equipment for making cuts and fills.

The party traveled from the Mexican border to the Costa Rican capital in station wagons, supplemented by Army "jeeps" through the rough territory of northern Costa Rica. In Honduras and Nicaragua the travelers bumped over ox-cart trails. Possibilities of using the highway for trucking operations were studied on the trip, in addition to the investigation of progress and construction problems.

MOTOR GRADERS
ROAD ROLLERS
SPREADERS
BY . .

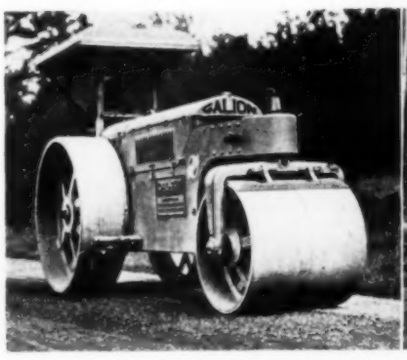
GALION

The Galion Iron Works & Mfg. Co.

Main Office and Works: Galion, Ohio

Galion continues to serve the armed forces with essential equipment for the Air Force, Coast Guard, Engineers, Marines, Navy and the Seabees. Galion continues to help bring the war ONE DAY NEARER VICTORY.

GALION ROAD MACHINERY



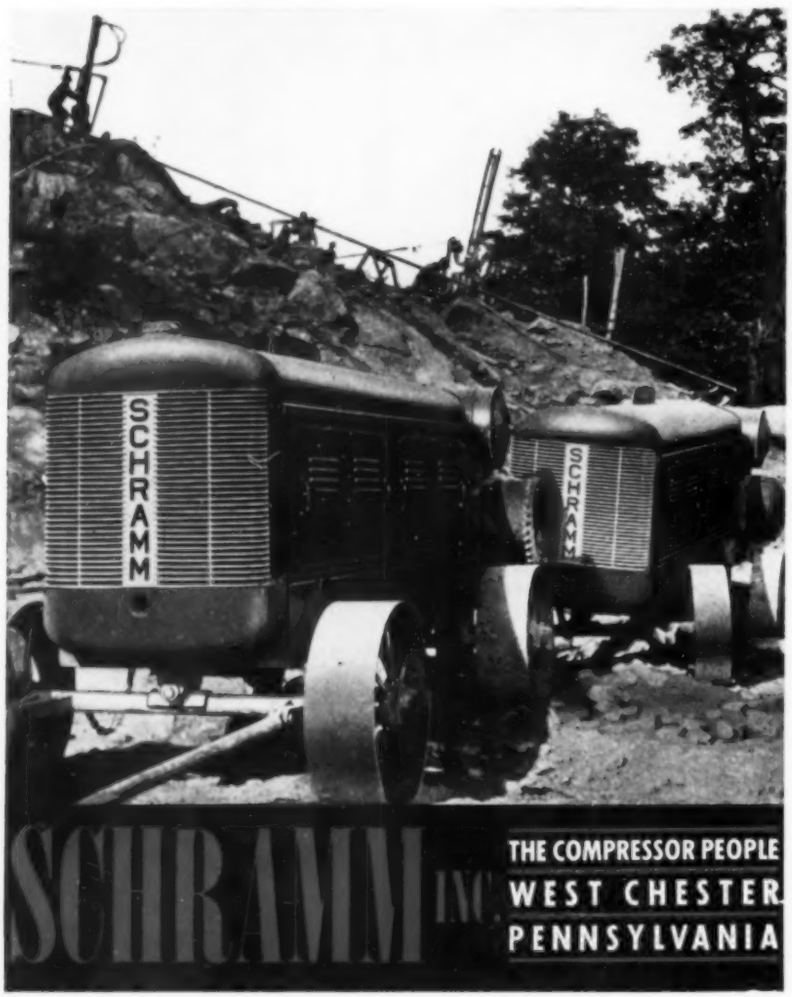
Schramm STAYS on the job from Start to Finish

WHEN you start a job you want to finish it on time . . . even beat the schedule, if possible. That's why construction engineers throughout the country use Schramm lightweight, heavy-duty Air Compressors; they stay right on the job—without breakdowns—until their work is done!

Illustrated are two SCHRAMM 315 cu. ft. actual air delivery compressors operating large type Wagon Drills on a big Road Building project in a mountainous region. Both compressors are powered by modern type Diesel Engines and were used continuously, without any interruption for service repairs, enabling the contractor to finish the job ahead of schedule at minimum cost. Like all SCHRAMM Compressors, the compactness and durability of these units makes it possible to haul them into the most inaccessible places.

SCHRAMM Compressors are compact units, 100% water cooled, having mechanical cam-operated intake valve . . . more and larger valves . . . forced feed lubrication to every moving part . . . safe, fast starting merely by pushing a button!

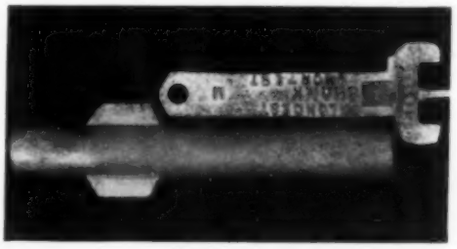
For detailed data write for Catalog 42-PA



War Gives New Importance to *Care of Rock Drills*

(Concluded from October Issue)

The shank ends of the drill steel and the ends of the pistons in the rock drills should be ground square; however, it is wise not to grind too much steel off the piston, because there is danger of exposing the soft core of the metal. Time consumed in forging shanks can be reduced by the use of drill steel sharpeners, which accurately form the hot metal into the proper shape.



TEMPERATURES that are too high when forging drill steel cause burned drill shanks and should be avoided.

For Best Forging Results

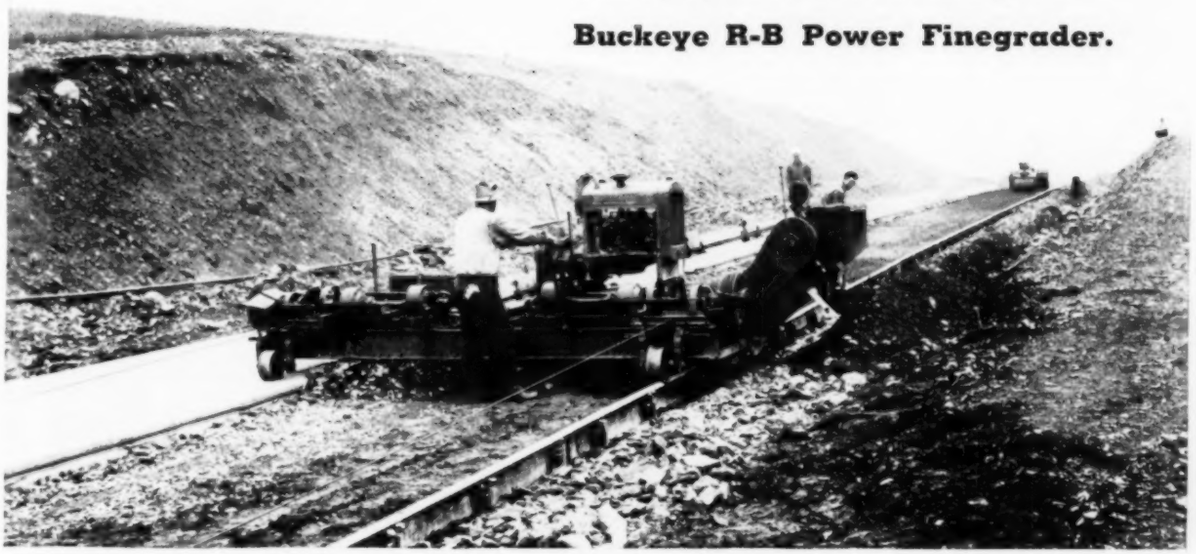
When forging a bit, the blacksmith must not only use the utmost care in shaping the piece, but he must also pay careful attention to the heat treatment. The bar steel to be forged should be carefully handled, because any nick on the surface may be the origin of a fracture. When the steel is heated, the heated area should be no longer than is necessary. Drill steel forging temperatures should be kept between 1,900 and 2,100 deg. These temperatures color the metal orange to lemon yellow. Steel should not be kept at the higher temperatures any longer than necessary, for high temperatures induce decarburization, which reduces wearing and cutting qualities.

When drill steel is forged, particular attention should be given to the hole that extends through the inside of hollow steels. If this hole is too small, it will restrict the flow of air or water, and in the case of wet machines it will damage the water tubes. Bits are hardened by

(Continued on page 142)

WAR has proved again...

No other existing equipment can prepare subgrade as quickly, cheaply and accurately as a Buckeye R-B Power Finegrader.



IT is significant that on a big percentage of road and airport runway jobs during this war period, when speed and good work were paramount, that Buckeye R-B Power Finegraders were put to work ahead of the pavers. At the record-breaking Willow Run bomber plant job, four complete paving outfits, each with an R-B Finegrader were used. On military access roads, offshore bases, black top and concrete air bases and many others . . . R-B Finegraders paced operations. In prewar road construction, 19 of the contractors on The Pennsylvania Turnpike used R-B's. On postwar work, contractors who have reviewed these records will make Buckeye R-B Power Finegraders an integral part of their paving outfits. Send for descriptive literature now while the subject is fresh in your mind.

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Findlay, Ohio

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Road construction is the key to postwar economic balance. The American Road Builders Association plan shows that a $3,000,000,000 postwar road, street and highway program is needed to meet the nation's needs. Here is an important source of jobs when our service men come home. Will your city, county and state be ready with completed plans?

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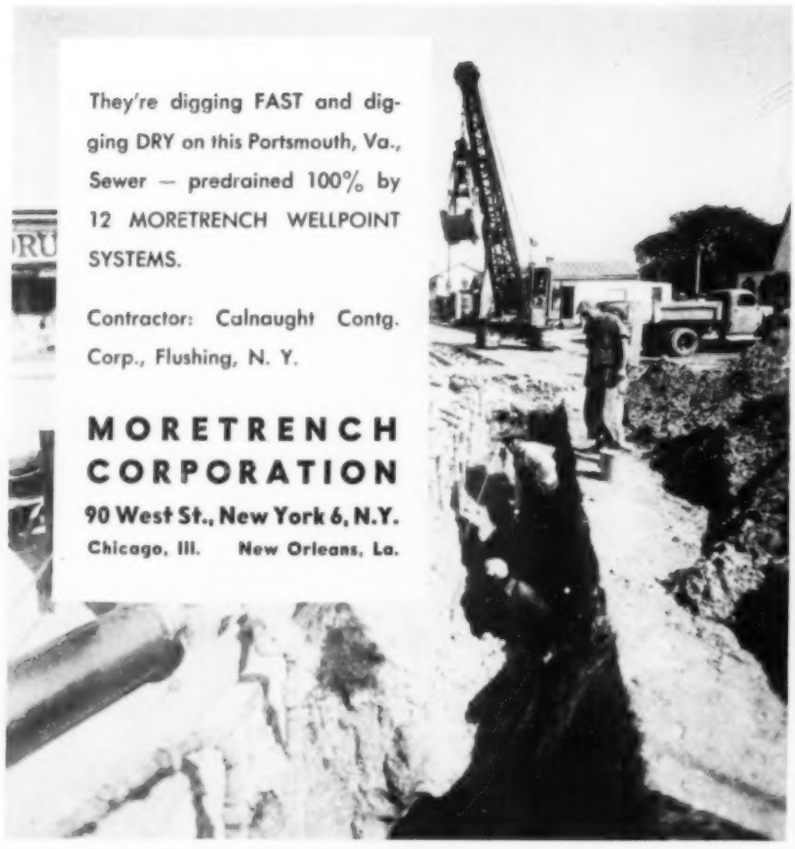

(Continued from page 140)

heating to 1,450 deg. F. The end of the bit should be submerged in running water or brine to a depth of ¾-in. and when the color fades completely, the entire heated end of the bar should be submerged and allowed to cool. If the ground water in a given locality is alkaline, rain water should be used. Drill shanks should be heated to 1,550 deg. F. and quenched in quenching oil, which should be circulating. Hardness of shanks should be kept between 350 and 400 Brinnell.

WORKMAN USES pavement breaker to tear up floors prior to installation of heavy war production equipment. Rock drill should be held down to its work.

Rock drill parts will break if the air pressure is too high. Low air pressure also should be avoided as it is especially damaging to stoping drills, since it will not hold them up to the work properly. Water pressure in drills should not be higher than the air pressure, for this will drive water into the drill mechanism and wash away the lubricant. Inspection should be made at frequent and regular intervals.

★ ★ ★

Welding Engineering Course

A FIVE-DAY COURSE on the latest methods and techniques on arc welding has been instituted by the Lincoln Electric Co., of Cleveland, Ohio. Subjects studied included the fundamentals of welding, common materials uses, analysis of machinery of welded design as compared to conventional design, consideration of rolled or formed shapes, and a review of the factors affecting cost and production.

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If you can't get a new Hough Shovel, grab a rebuilt unit. It'll pay off well if properly maintained, and maintenance is simple.

Keep clean oil in the hydraulic system at the proper level . . . Flush entire system every 400 hours . . . Use bucket teeth for digging clay and shale . . . Keep bucket cutting edges sharp for fastest digging . . . Use special width buckets for rehandling and light material loading (your dealer has details) . . . Shorten snap chains to increase dumping height on free dumping materials . . . Hardface weld the bucket cutting edges for maximum life . . . Lay your job out to do as little turning as possible; it extends crawler life . . . Don't turn in soft-going — run straight across the job . . . Use only a bulldozer blade for all backfilling and bulldozing jobs.

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Constructors' Association Broadcasts Sunday Series on "Jobs After the War"

TO STIMULATE PUBLIC PARTICIPATION in the post-war works program proposed by the Pre-Planning Committee of the Constructors' Association of Western Pennsylvania, as described in *Construction Methods*, July 1943, p. 60, the Association bought radio time from Pittsburgh's powerful station KDKA at 1:45 p.m. on seven successive Sundays, Sept. 12 to Oct. 24, and broadcast a series of 15-min. messages designed to inspire prompt action in acquiring sites and preparing working drawings for construction projects to be started at the opportune moment after the war. Each talk placed the responsibility for effective action on the individual—the local citizen, public official or industrialist. Emphasis was put on local works, to be carried out by communities, cities, counties, and private owners, but the important volume of construction to be contributed through programs of the states and the federal government was fairly presented by statements from the secretary of highways for the State of Pennsylvania, the district engineer for the Corps of Engineers, U. S. Army, and the administrator for the Housing Authority of the City of Pittsburgh.

Actually, the projects named for post-war construction by public officials and private citizens who delivered the talks are, in general, integral parts of broader programs, some of which are already partly completed and all of which extend several years into the future.

In charge of the series of broadcasts for the Constructors' Association of Western Pennsylvania was Roy A. MacGregor, executive secretary, who delivered the first talk and introduced the speaker on each of the succeeding broadcasts. In order, those who appeared on the series with Mr. MacGregor were John E. O'Leary, chairman, public relations committee, Constructors' Association of Western Pennsylvania, who quoted prepared statements by Col. Gilbert Van B. Wilkes, district engineer for the U. S. Engineers, and John U. Shroyer, secretary of highways for the State of Pennsylvania; John J. Kane, chairman, Board of County Commissioners of Allegheny County; A. L. Wolk, chairman, public service and survey committee, City Council of Pittsburgh; George R. Hennig, speaking for Hunter P. Wharton, secretary, Pittsburgh Building and Construction Trades Council; Bryn J. Hovde, administrator, Housing Authority of the City of Pittsburgh; and Francis McQuillin, manager of industrial sales, West Penn Power Co.

MAKE THIS TEST — Prove BRIXMENT is BEST!

Take some Brixment mortar and some 50-50 lime and cement mortar. Try shoving a full head-joint with each mortar. You'll find that with the Brixment mortar (1), it is much easier to shove the brick accurately into place, with a full head-joint, than it is to do the same thing with the other mortar (2).

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One of the most important characteristics any mortar can possess is *plasticity*. Within certain limits, plasticity is the greatest single factor not only in the *economy* of the brickwork, but also in its strength, its neatness and its resistance to the passage of water.

One of the most outstanding characteristics of Brixment mortar is its unusual plasticity. For nearly twenty-five years, bricklayers all over the United States have agreed that the working qualities of Brixment are comparable to those of straight lime putty. This exceptional plasticity makes it easy for the bricklayer to secure neat, economical brickwork, with the brick properly bedded, and the joints well filled. And because of this unusual plasticity, a bag of Brixment will carry three full cubic feet of sand and still make an ideally workable mortar.

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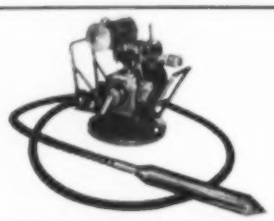
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This unusual photograph was made on a road job between Cambridge and Midvale, Idaho. It shows a "Caterpillar" Diesel Tractor and Le Tourneau Rooter breaking up and loosening compacted rock in order to decrease scraper loading time. It's a tough pull for the tractor; but not as tough as it could be, for both tractor and rooter are equipped with Timken Tapered Roller Bearings—drastically reducing frictional resistance. Besides this, Timken Bearings increase endurance and cut maintenance by their ability to carry radial, thrust and combined loads; and to hold moving parts in correct and constant alignment. These qualities are helping to give superior performance to American war machines of every kind. The Timken Roller Bearing Company, Canton, Ohio.

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